DIPTERA OF THE SUPERFAMILY TIPULOIDEA FOUND IN THE DISTRICT OF COLUMBIA.

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INTRODUCTION.

The present contribution to a series of lists of District of Columbia Diptera includes the Tipulidae and three smaller families closely related to them. Inclusion of families of lesser with those of greater importance—in other words, making the superfamily[1] the unit of the list—is deemed good policy, as it will avoid having finally left over for treatment a miscellaneous lot of the smaller families.

The fragile, long-legged flies that are known commonly to American naturalists as crane-flies, are called by a variety of local or regional names. In Britain their almost universal name is "daddy longlegs"—a term in this country applied to the Phalangidae or harvest-men. In northern Scotland they are often called "spinners"; in south-central Scotland, "jenny meggies," only the larger species being known as crane-flies. In parts of the United States the larger species are called "gallinippers" and are greatly feared by certain individuals, who mistake them for giant mosquitoes. In parts of the Southern States the large dancing crane-flies pass by the name of "weavers." The large, thick-bodied, tough-skinned larvae of the larger crane-flies are sometimes called "leather-jackets."

Crane-flies abound in almost all parts of the world, being restricted only by intense cold and dryness. Water or moisture is a necessary condition for the development of the immature stages of most species of Tipulidae, and as a result extensive deserts or plains

[1] In this respect the classification of J. R. Malloch is followed. See A Preliminary Classification of Diptera, etc., Part 1, Bull. III. State Lab. Nat. Hist., vol. 12, art. 3, March, 1917, p. 182.

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form efficient barriers to their dispersal. Nearly 3,000 species of crane-flies have already been made known to science and many others remain to be described. Many species are comparatively local in their distribution, but a few species are very widespread, especially *Helobia hybrida*, which ranges over most of Asia, Europe, and the New World, and *Dicranomyia longipennis*, which ranges in a wide belt around the world in the North Temperate Zone. As in many other groups of insects most of the local species of Tipulidae are very seasonal in their appearance, there being vernal, early summer, midsummer, and autumnal species, as well as others that fly throughout most of the summer, and still others that are undoubtedly double-brooded, one brood occurring in the spring, the second in late summer. The larger number of Tipulidae in the vicinity of Washington are on the wing during the month of June. Many of the larger species of crane-flies, belonging to the genera *Tipula* and *Nephrotoma*, are of considerable economic importance, the larvae devouring the roots of various plants, often killing the vegetation over large areas.

Crane-flies inhabit a variety of situations, although, as mentioned previously, most species require wet or moist conditions for their development. The adult flies are commonly met with along streams or in woods where the larvae occur beneath the thick layer of leaf mold. They may be swept from low vegetation growing in such haunts. It may be noted that the situations frequented by crane-flies are usually preferred by species of dance-flies, Empididae, both of these great groups being rare in species or individuals in dry or desert conditions. Many crane-flies are found along cliffs or rocky walls of gorges, such as are found in the various runs along the Potomac. Such forms, as *Dicranomyia simulans*, *D. badia*, some *Geranomyia*, *Limnophila montana*, many *Oropeza* and others, are found resting on the rocky walls or hanging in crevices or crannies in the cliffs. The species that are found in wet meadows and open swales are largely distinct from the species occurring in woods and in shaded swamps. Moreover, the Tipulid fauna of high, dry upland woods is rather peculiar, consisting almost entirely of many species of the genus *Tipula*, with very few of the smaller Limnobine crane-flies (as *Dicranoptycha*, *Cladura*, etc.). The crane-flies of the bogs, such as are found near Beltsville, and those frequenting cypress swamps, are often peculiar to such situations. The immature stages of these insects frequent a variety of habitats that are indicated in some detail under the various generic accounts in this paper. The authors, on a collecting trip taken July 25, 1915, along the Potomac, by way of Dead, Scott's, and Difficult Runs, secured a total of 48 species of these insects. When it is considered that the height of the

collecting season for these flies in this vicinity is mid-June or earlier, it will be appreciated that the Tipulid fauna of the District is very rich indeed.

The Tipulidae and their allies of the vicinity of Washington, D. C., are a particularly interesting group for study, for the reason that so many of the species were originally described from here. No fewer than 87[1] species of crane-flies have been described from material wholly or in part from our region—a record due chiefly to the zealous entomological activities of C. R. Osten Sacken.

This gentleman was secretary to the Russian legation in Washington from 1856 to 1862, and lived elsewhere in the United States, most of the time up to the year 1877. Of this period he says:[2]

> These 21 years were, as regards entomology, principally devoted, in collaboration with Dr. H. Loew, to the task of working up the Diptera of North America.[2]

With reference to Washington scientists whom he met, Osten Sacken speaks in the highest terms of Spencer F. Baird, then secretary of the Smithsonian Institution, and takes occasion "to pay a tribute of heartfelt gratitude and admiration to Baird, to whose encouragement, support, and example," he says, "I owe a considerable share of my success." (P. 9.)

"Among other men of science," Osten Sacken adds, "who have been useful to me in contributing to my studies on *Cynipidæ*, I owe a debt of gratitude to Mr. E. Foreman, of the United States Patent Office in Washington, with whom (between 1856 and 1861) I took frequent walks in the environs of that city. He taught me to distinguish the numerous species of oaks occurring in the United States, and procured me many new galls and other vegetable deformations." (P. 41.)

The period mentioned was that of Osten Sacken's collecting activities about Washington; publication of the results came later. One of Osten Sacken's favorite collecting grounds was the Smithsonian Park and westward parts of the Mall, then a nearly natural forest. Those who have seen him collecting crane-flies say that his favorite implement for catching them was the collecting forceps, in the use of which he was incredibly adept. Specimens caught were pinned on the spot, and placed in a box carried for the purpose, or in a cork lining of his high hat. Osten Sacken collected more than 120 species of crane-flies in the District of Columbia region, of a large proportion of which he published the original descriptions. The descriptions of 50 species recognized nowadays were based either wholly or in part upon local material.

[1] Designated by asterisks in the list. In such cases the data, if only Washington, D. C., or District of Columbia is not repeated among the records.

[2] Record of my life work in entomology. 1903–4, p. 3.

Of the total number of species of crane-flies in the following list 85 were described by Osten Sacken, 38 by Alexander, 25 by Loew, 15 by Say, 12 by Johnson, and the remainder by a number of other entomologists. Of the species that were originally described from District of Columbia material six have not been re-collected here. These species are:

Tipula fragilis Loew; *Tipula grata* Loew; *Tipula ignobilis* Loew. *Ormosia holotricha* Osten Sacken; *Ormosia nigripila* Osten Sacken; *Tricyphona vernalis* Osten Sacken.

Comparisons of the present with other local lists may be noted as follows:

From New England there have been recorded 240 species; from New York, 272; from New Jersey, 165; District of Columbia, 201; North Carolina, 116; and from Florida, 45. In comparing these lists it must be borne in mind that the species of crane-flies are very much more numerous in the northern part of the United States than in the Southern States, which accounts for the small list from Florida and the relatively large one from New York.

With respect to local distribution of the crane-flies hereafter listed it may be said that 83 species, so far as collected, occur only in the Piedmont Region and 11 in the Coastal Plain.[1] These figures indicate that our crane-fly fauna has much stronger affinities with northern and upland than with southern and lowland faunas. Of the 11 species collected only in the Coastal Plain three, (*Dicranomyia gladiator*, *Rhamphidia mainensis*, and *Limnophila niveitarsis*) are northern forms, which, like numerous northern plants, etc., find the most favorable habitat in this region, in the Magnolia bogs of the Coastal Plain.[2] One of the craneflies also (*Molophilus nova-caesariensis*) illustrates the relationship of these bogs to the Pine Barrens.

For those especially interested in the fauna of Plummers Island, Maryland, it may be stated that 91 species of Tipuloidea have been collected on that Island, and 66 others in the Great Falls–Little Falls section of the Potomac River Valley. Where distribution with respect to Plummers Island is not indicated by the records quoted it is denoted by the initials P. I. and V. P. I. (vicinity of Plummers Island).

For records of specimens, access to collections, and other help in the preparation of the following list the writers are indebted to Dr. J. M. Aldrich and Messrs. Nathan Banks and Charles T. Greene.

[1] For explanation of these terms, see Bull. 1, Biol. Soc. Wash., A Sketch of the Natural History of the District of Columbia, etc. 1918. Pp. 57–74.

[2] Idem, p. 81.

KEY TO FAMILIES OF SUPERFAMILY TIPULOIDEA.

1. Five branches of the radius reaching the wing margin; a single anal vein [1]---
TANYDERIDAE (p. 389).
Less than five branches of the radius reaching the wing margin; one or two anal veins----2.
2. Ocelli present----RHYPHIDAE (p. 390).
Ocelli lacking---- 3.
3. A single anal vein----PTYCHOPTERIDAE (p. 389).
Two anal veins----TIPULIDAE (p. 392).

Family TANYDERIDAE.

Genus PROTOPLASA Osten Sacken.

PROTOPLASA FITCHII Osten Sacken.

The adults of this rare fly have never been taken in the ordinary accepted limits of the District of Columbia fauna, but are regional, having been secured in greatest numbers in North Carolina and New York. The nearest point of capture is Camp Meade, Maryland, where a specimen was taken in May, 1918, by R. C. Shannon. A curious dipterous larva that is referred to this species with considerable confidence was found in late May, 1916, by Messrs. H. S. Barber, Charles T. Greene, and R. C. Shannon in a much decayed drift log of soft maple near the mouth of Dead Run, opposite Plummers Island, where they were associated with larvae of the wood-boring syrphid, *Temnostoma bombylans*, and a crane-fly, *Epiphragma solatrix*. Larvae were again found on May 27, 1917, by H. L. Viereck, who sent one large larva to Ithaca, New York, where it was placed in a rearing cage, but died soon thereafter.

Family PTYCHOPTERIDAE.

KEY TO GENERA.

1. Antennae with 16 segments; legs not banded with black and white; two branches of media reaching the wing margin----*Ptychoptera* (p. 389).
Antennae with more than 16 segments; legs conspicuously banded with black and white; a single branch of media reaching the wing margin----2.
2. Metatarsi not swollen; apical cells of the wing pubescent----
Bittacomorphella (p. 390).
Metatarsi conspicuously swollen; apical cells of the wings not pubescent----
Bittacomorpha (p. 390).

Genus PTYCHOPTERA Meigen.

PTYCHOPTERA RUFOCINCTA Osten Sacken.

This is the only regional species. The pale brownish-white larvae live in wet organic mud, often associated with the larvae and pupae of *Bittacomorpha clavipes*. The adults are common about swamps; extreme dates of collection are May 8 and August 15; in copulation, July 16; at honey-dew on tulip tree, July 4, 1917, McAtee. V. P. I.

[1] For explanation of the venational terms used in the keys in this paper see plate 23 and its legend, on page 435.

Genus BITTACOMORPHELLA Alexander.

BITTACOMORPHELLA JONESI Johnson.

The pygmy phantom crane-fly is a very local species. The curious short black larva lies in rich organic mud in cold woods. This species has been taken at Glencarlyn, Virginia, by Nathan Banks.

Genus BITTACOMORPHA Westwood.

BITTACOMORPHA CLAVIPES Fabricius.

The phantom crane-fly is one of the most common species of the Tipuloidea. The curious rust-brown larvae live in organic matter and mud in open swamps and swales. Adults have been collected in all parts of the Washington region, at dates ranging from April 6 to October 8; in copulation, April 12, October 8. The species is attracted at light. V. P. I.

Family RHYPHIDAE.

KEY TO GENERA.

1. Cell *1st* M_2 lacking ..... *Mycetobia* (p. 390).
   Cell *1st* M_2 present ..... 2.
2. A single anal vein; two branches of the radial sector reaching the wing margin ..... *Rhyphus* (p. 390).
   Two anal veins; three branches of the radial sector reaching the wing margin ..... *Trichocera* (p. 391)

Genus MYCETOBIA Meigen.

MYCETOBIA PERSICAE Riley.

Numerous specimens bred from gum and frass from around bases of peach trees where the peach-tree borer had been working, Arlington, Virginia, October, 1915, W. B. Wood.

Genus RHYPHUS Latreille.

KEY TO SPECIES.

1. The two veins that form the outer end of cell *First* M_2 subequal, or the basal deflection of M_2 longer than m; a faint yellowish blotch at the end of Sc; brown wing markings extensive, including the wing apex ..... 2.
   The basal deflection of M_2 usually punctiform, much shorter than m; no yellowish blotch at the end of Sc; brown wing markings scanty, appearing as about three blotches on the basal two-thirds, the outermost lying at the tip of R_1, the wing apex clear ..... *R. punctatus.*
2. Wing pattern clear cut, the brown markings extensive; the subapical drop white or hyaline, sharply delimited; r–m at nearly two-thirds the length of cell *first M* ..... *R. alternatus.*
   Wing pattern more diffuse, the brown markings less extensive, the subapical drop subhyaline to grayish, not clearly delimited; r–m at about one-half the length of cell *first M*. (Regional) ..... *R. fenestralis* Scopoli.

RHYPHUS ALTERNATUS Say.

Common; dates of collection range from February 28 to July 23; has been bred from decayed fungus; comes to sap. P. I.

RHYPHUS PUNCTATUS Fabricius.

Virginia near Plummers Island, September 4, 1903, H. S. Barber; Plummers Island, April 23, 1914, R. C. Shannon; Falls Church, Virginia, July 11, 1912; August 9, 1917, reared from cow dung, C. T. Greene; June 7, 1914, R. C. Shannon.

Genus TRICHOCERA Meigen.

The genus Trichocera at this time presents almost insuperable taxonomic difficulties. The keys and determinations here given must therefore be considered as tentative. The immature stages occur in decaying organic matter.

KEY TO SPECIES.

1. Wings more or less distinctly marked with darker ..... 2.
   Wings unmarked, hyaline or subhyaline ..... 3.
2. Wings with two brown clouds, one near the origin of the sector, the other at *r–m* ..... *T. bimacula* (p. 391).
   Wings with a very faint brown cloud at *r-m* and less distinct clouds along with branches of *Cu* ..... *T. regelationis* (p. 391).
3. Mesonotum brownish gray with four brown stripes; wings grayish subhyaline ..... *T. hiemalis* (p. 391).
   Mesonotum clear gray with two stripes indicated only on the anterior portion of the sclerite; wings nearly hyaline. (Regional) ..... *T. brumalis* Fitch.

TRICHOCERA BIMACULA Walker.

The specimens determined as this species were collected at Washington, District of Columbia, November 18, 20, 1913, F. Knab; November 23, 1906, McAtee; January 5, 1906, Alexander; and at Plummers Island, November 2, 1903, E. A. Schwarz and H. S. Barber; October 27 and December 31, 1906, A. K. Fisher.

TRICHOCERA HIEMALIS De Geer.

Washington, District of Columbia, November 4, 1906, F. Knab.

TRICHOCERA REGELATIONIS Linnaeus.

Washington, District of Columbia, March 29, 1907, McAtee; Plummers Island, February 24, 1903, R. P. Currie.

Family TIPULIDAE.

KEY TO SUBFAMILIES AND TRIBES.

1. Last segment of the maxillary palpi elongate, whiplash-like; nasus usually distinct; antennae usually with 13 segments; *Sc* almost always ending in *R*; *m–cu* present or obliterated by the usually slight fusion of Cu_1 *on* M_3. (In *Brachypremna*, *Sc* is unusually long and ends in costa and the fusion of Cu_1 and M_3 is rather extensive, but the antennae are 13-segmented, the palpi elongate, and the nasus distinct) ..... *Tipulinae* 2.

   Last segment of the maxillary palpi short; no distinct nasus; antennae usually with 14 or 16 segments; *Sc* ending in C but connected with *R* by Sc_2; *m-cu* obliterated by the long fusion of *Cu*, on M_3. (*Pedicia* has the palpi elongate but all other features are essentially Limnobiine.) ..... *Limnobiinae; Cylindrotominae* 4.

2. Vein R_2 obliterated by atrophy, or (*Brachypremna*), the second anal vein very short, not more than one-third the length of the first anal vein; legs very long and slender ..... *Dolichopezini* (p. 393).

   Vein R_2 present for its entire length; second anal vein longer, about one-half of the length of the first or more; legs usually shorter and stouter ..... 3.

3. Antennae without verticils; flagellum of the male antennae pectinate ..... *Ctenophorini* (p. 394).

   Antennae verticillate; flagellum of the male antennae not pectinate ..... *Tipulini* (p. 395).

4. Four branches of radious reaching the wing margin. (In *Gonomyia blanda*, R_2 runs close to R_1 at the margin so but three branches appear to attain the margin) ..... 5.

   Two or three branches of radius reaching the wing margin ..... 9.

5. Tibiae spurred at tip ..... 6.

   Tibiae without spurs at tip ..... *Eriopterini* (p. 416).

6. Antennae with from 6 to 10 segments ..... *Hexatomini* (p. 428).

   Antennae with more than 10 segments ..... 7.

7. Sc_2 beyond the origin of *Rs* ..... *Limnophilini* (except *Ula*) (p. 423).

   Sc_2 before the origin of *Rs* ..... 8.

8. Antennae 17-segmented; wings entirely pubescent ..... *Ula* (*Limnophilini*) (p. 423).

   Antennae with from 13 to 16 segments ..... *Pediciini* (p. 429).

9. Tibiae spurred; an apparent fusion of R_{1+2+3} to the wing margin, so that but two branches of the radius are present ..... *Cylindrotominae* (p. 432).

   Tibiae without spurs (In the genera *Atarba* and *Elephantomyia* of the Antochini, the tibiae bear small spurs, but the venation is not as in the Cylindrotominae.) Veins R_1 and R_{2+3} not contiguous at their tips.

10. Antennae with 12, 15 or 16 segments; claws usually without teeth on their lower side, or at most with a single subbasal tooth ..... 11.

    Antennae with 14 segments; claws with teeth on their lower side ..... *Limnobiini* (p. 407).

11. Crossvein *r* lacking; *Sc* ending before the origin of the short *Rs*; R_{2+3} upcurved at the end; R_{4+5} bent strongly toward the wing apex, producing a trumpet-shaped cell R_3; cell *1st* M_2, if present, pointed at its inner end. *Leiponeura* (genus *Gonomyia*) (p. 420).

    Crossvein *r* present or lacking; if the latter, *Sc* ends far beyond the origin of *Rs*; R_{2+3} not strongly upcurved at the end; R_{4+5} not bent strongly toward the wing apex; inner end of cell *1st* M_2, if present, not pointed ..... *Antochini* (p. 413).

Tribe DOLICHOPEZINI.

KEY TO GENERA.

1. Tip of vein R_2 atrophied; *Rs* very short, transverse, simulating a cross-vein; second anal vein long, about two-thirds the length of the first; *Sc* moderate in length, ending in *R*_____*Oropeza* (p. 393).
   Tip of vein R_2 present, the vein almost perpendicular to $R_2{+}_3$ at its origin; *Rs* long, strongly arcuated at its origin; second anal vein very short, about one-third the length of the first; *Sc* very long, ending in *C*_____*Brachypremna* (p. 394).

Genus OROPEZA Needham.

KEY TO SPECIES.

1. Tarsi, at least, entirely white_____2.
   Tarsi yellow or brownish_____3.
2. Digitiform appendages of the male hypopygium short or rudimentary; ventral margin deeply and narrowly emarginate____*O. albipes* (p. 393).
   Digitiform appendages of the male hypopygium moderate in length; ventral margin broadly emarginate_____*O. subalbipes* (p. 393).
3. Halteres with the knobs dark brown_____4.
   Halteres entirely yellowish_____*O. sayi* (p. 393).
4. Stripes of the thorax distinct; pleura spotted_____*O. dorsalis* (p. 393).
   Stripes of the thorax obscure; pleura dark_____5.
5. Thorax opaque_____*O. obscura* (p. 393).
   Thorax shining_____*O. obscura polita.*

The above key is adapted from one by Johnson. *O. subalbipes* is distinguished with difficulty from *O. albipes*. The immature stages of the species of *Oropeza* are spent in usually dry moss or in soil.

OROPEZA ALBIPES Johnson.

Common; season May 30 to August 25. P. I.

OROPEZA DORSALIS Johnson.

Washington, District of Columbia, June 11, 1910, F. Knab; Plummers Island, June 19, 1913, at light, R. C. Shannon; August 18, 1912, J. R. Malloch.

OROPEZA OBSCURA Johnson.

Common; season May 17 to August 30; in copula June 7. The variety *polita* Johnson was taken from a spider's web at Rosslyn, Virginia, August 25, 1912, F. Knab. P. I.

OROPEZA SAYI Johnson.

Plummers Island, July 31, 1912, E. A. Schwarz and H. S. Barber; August 25, 1904, R. P. Currie.

OROPEZA SUBALBIPES Johnson.

Specimens identified as this form were taken at Dead Run, Virginia, July 21, 1915, Virginia near Plummers Island, July 14, 1915, Four-mile Run, Virginia, May 31, 1914, McAtee; June 7, 1914, L. O. Jackson; Beltsville, Maryland, June 9, 1915, June 14, 1914; and Odenton, Maryland, June 20, 1915, McAtee.

Genus BRACHYPREMNA Osten Sacken.

BRACHPYREMNA DISPELLENS Walker.

On account of its mazy dancing flight, this species is sometimes called the "weaver." The immature stages are spent in decaying wood. The large adults are fairly common in our region, the dates of collection ranging from June 26 to August 11; in copula, July 2. P. I.

Tribe CTENOPHORINI.

KEY TO GENERA.

1. Antennæ of the male with three pectinations on each flagellar segment, a single pectination on the apical half in addition to the usual basal pair; ovipositor of the female greatly elongated, saber-like.....*Tanyptera* (p. 394).
   Antennæ of the male with two pairs of pectinations on each flagellar segment, one pair being subbasal and the other subapical; ovipositor of the female short and of normal Tipuline structure.....*Ctenophora* (p. 394).

Genus TANYPTERA Latreille.

KEY TO SPECIES.

1. Wings smoky black, body coloration black, the male with the feet and abdomen also black, the female with the feet and base of the abdomen reddish yellow.....*T. fumipennis* (p. 394).
   Wings not black.....2.
2. Wings tinged with topazine yellow, the stigma dark brown; body coloration varying from black to yellow, the feet reddish yellow. (Regional).....*T. topazina.*
   Wings hyaline, the stigma brown; head black, body coloration varying from black to yellow.....*T. frontalis* (p. 394).

The immature stages of species of this genus are spent in wood that is relatively sound, the larvae tunneling through the bark and xylem.

TANYPTERA FRONTALIS Osten Sacken.

Plummers Island, May 28, 1916, H. L. Viereck.

TANYPTERA FUMIPENNIS Osten Sacken.

Great Falls, Virginia, May 24, 1915, C. T. Greene; May 23, 1918, McAtee; Dead Run, Virginia, May 21, 1916, R. C. Shannon; May 25, 1916, T. A. Keleher; May 27, 1917, F. C. Craighead; Plummers Island, April 12, 1915, bred from maple log, R. C. Shannon; May 29, 1902, Geo. P. Engelhardt; June 7, 1913, H. S. Barber.

Genus CTENOPHORA Meigen.

KEY TO SPECIES.

1. Wings with the entire apex beyond the cord tinged with blackish. (Regional.).....*C. apicata* Osten Sacken.
   Wings nearly hyaline, with a large brown cloud between the cord and the wing tip but not reaching the apical margin. (Regional.).....*C. nubecula* Osten Sacken.

These species are locally common where found but have not yet been collected in our region. Their immature stages occur in decaying wood.

Tribe TIPULINI.

KEY TO GENERA.

1. Abdomen greatly elongated in both sexes, much longer than the wing; antennae very small; male hypopygium of simple structure, the pleural appendages lying in the dorsal cavity of the ninth sternopleurite_____2.
   Abdomen not greatly elongated in the male, very rarely so in the female (*Tipula longiventris*) male hypopygium otherwise_____3.
2. Cell M. sessile, wings strongly suffused with reddish-brown_____
   Aeshnasoma (p. 395).
   Cell M, short-petiolate; grayish, the subcostal cell brown__*Longurio* (p. 395).
3. *Rs* usually very short, almost transverse, simulating a crossvein; cell M_1 sessile or short-petiolate; basal deflection of Cu_1 or *m-cu* joining M at or before the fork; coloration usually yellow and black, shiny_____
   Nephrotoma (p. 395).
   Rs usually longer, not appearing like a crossvein; cell M_1 always petiolate; basal deflection of Cu_1 or *m-cu* joining *M* at its fork or, usually, underneath cell *first* M_2; coloration usually dull brown, yellow, or gray_____
   Tipula (p. 398).

Genus LONGURIO Loew.

LONGURIO TESTACEUS Loew.

Virginia near Plummers Island, June 24, 1908, H. S. Barber; Cabin John Bridge, May 31, 1900 (pupal skin). This is the largest species of crane-fly in eastern North America, and in the female sex even exceeds the better known, *Holorusia rubiginosa* of the western States. The immature stages live in sandy soil along the margins of streams.

Genus AESHNASOMA Johnson.

AESHNASOMA RIVERTONENSIS Johnson.

Maywood, Virginia, July 10, 1919, at light, McAtee; previously known only from New Jersey.

Genus NEPHROTOMA Meigen.

KEY TO SPECIES.

1. Thoracic stripes black or blackish_____2.
   Thoracic stripes, if present, brownish or reddish_____3.
2. Antennal flagellum uniformly black; tip of wings and stigma darkened, the latter dark brown; velvety black marks at the ends of the V-shaped suture and the lateral praescutal stripes small, not close together; postnotum with a brown median line_____*N. incurva* (p. 397).
   Antennal flagellum with the basal segments bicolorous; tip of the wings not darkened; stigma pale brown; velvety black marks at the ends of the V-shaped suture very extensive, so the pale yellow lateral margin of the sclerite is restricted; postnotum yellow, unmarked_____
   N. virescens (p. 397).
3. Thoracic dorsum dull, opaque_____4.
   Thoracic dorsum shiny; if at all opaque, the antennae of both sexes very short (*tenuis* group)_____6.
4. Antennae of the male elongate, more than half the length of the body, the flagellum black_____*N. macrocera* (p. 397).
   Antennae short in both sexes, the flagellar segments indistinctly pale at base_____5.

5. Male hypopygium incrassated, the ninth tergite very tumid, the two halves separated by a deep median longitudinal furrow....*N. cornifera* (p. 396).
Male hypopygium small, not conspicuously incrassated..*N. tenuis* (p. 397).
6. Antennal segments uniform in color....7.
Antennal segments bicolorous....16.
7. A velvety black spot at the ends of the lateral praescutal stripe....8.
No such spot....9.
8. Occiput with a narrow brown median line....*N. calinota* (p. 396).
Occiput without such a line....*N. punctum* (p. 397).
9. Occiput opaque with a shining triangular median spot....10.
Occiput shining....13.
10. A black spot at the ends of the V-shaped suture....*N. ferruginea* (p. 397).
No such spot....11.
11. Antennae entirely yellowish....*N. festina* (p. 397).
Antennal flagellum dark brown or black....12.
12. Stigma pale, brownish yellow....*N. occipitalis* (p. 397).
Stigma dark, blackish brown (Regional)....*N. gracilicornis* (Loew).
13. Antennae yellowish....*N. festina* (p. 397).
Antennal flagellum dark brown or black....14.
14. Head with a shining triangular spot....*N. occipitalis* (p. 397).
Head unicolorous....15.
15. Head and thorax yellowish, almost opaque; color in life strongly greenish....*N. tenuis* (p. 397).
Head orange except the lateral margins of the vertex; thorax shining....*N. sodalis* (p. 397).
16. Segments of the flagellum dark brown or black at the base; antennae with 13 segments....17.
Segments of the flagellum yellow at the base; antennae with more than 13 segments....18.
17. Wings strongly tinged with yellow; thorax shiny reddish without distinct stripes; antennae of the male elongated, strongly bicolorous....*N. xanthosigma* (p. 398).
Wings grayish, more yellowish basally; thorax with rusty gray pruinose stripes, the intermediate one with a narrow black median vitta; antennae short in both sexes, indistinctly bicolorous....*N. calinota* (p. 396).
18. Stigma yellowish brown; wing apex not darkened....*N. cucera* (p. 396).
Stigma dark brown wing apex distinctly infuscated..*N. polymera* (p. 397).

The immature stages of the species of *Nephrotoma* are spent in earth, decaying wood, and moss.

* NEPHROTOMA CALINOTA Dietz.

Plummer's Island, June 8, 1913, A. Wetmore; July 14, 1907, A. K. Fisher.

* NEPHROTOMA CORNIFERA Dietz.

Four-mile Run, Virginia, July 24, 1915, Alexander.

* NEPHROTOMA EUCERA Loew.

Forest Glen, Maryland, May 31, 1914, F. Knab; Great Falls, Virginia, June 14, 1914, L. O. Jackson; Plummers Island, May 24, 1902, R. P. Currie; May 24, 1914, McAtee; June 9, 1914, R. C. Shannon; Falls Church, Virginia, July 14, 1913, F. Knab; Mount Vernon, Virginia, June 9, 1918, McAtee.

NEPHROTOMA FERRUGINEA Fabricius.

Common; extreme dates of collection, April 19 and October 17; in copula, April 28, May 25, August 6; specimens bred from pupae June 1 and July 28. P. I.

* NEPHROTOMA FESTINA Dietz.

Plummers Island, July 28, 1912, McAtee.

* NEPHROTOMA INCURVA Loew.

Scott's Run to Ball's Hill, Virginia, August 12, 1917, McAtee; Plummers Island, June 26, 1905, H. S. Barber; June 27, 1909; Maryland near Plummers Island, July 27, 1916, McAtee; Cabin John Bridge, Maryland, June 28, 1913, R. C. Shannon, July 29, 1916; Lakeland to Riverdale, Maryland, July 14, 1916, McAtee.

NEPHROTOMA MACROCERA Say.

Abundant; season May 16 to September 13. P. I.

NEPHROTOMA OCCIPITALIS Loew.

Plummers Island, August 24, 1907, McAtee.

NEPHROTOMA POLYMERA Loew.

Falls Church, Virginia, September 26, 1915; Virginia near Plummers Island, June 17, 1913, Plummers Island, June 2, 1916, June 17, 1913, McAtee; Glen Echo, Maryland, June 3, 1898, R. P. Currie; Forest Glen, Maryland, June 1, 1913, F. Knab.

NEPHROTOMA PUNCTUM Loew.

Plummers Island, June 17, 1906, McAtee; Maryland near Plummers Island, June 29, 1903, in copula, W. V. Warner.

NEPHROTOMA SODALIS Loew.

Plummers Island, July 7, 21, 28, August 25, 1912, McAtee; August 3, R. P. Currie; Washington, District of Columbia, June 13, 1909, McAtee.

NEPHROTOMA TENUIS Loew.

Falls Church, Virginia, July 13, 1913; Glencarlyn, Virginia, June 15, 1913, F. Knab; Virginia near Plummers Island, September 5, 1915, L. O. Jackson; Plummers Island, June 6, 1909; Beltsville, Maryland, September 30, 1917, McAtee.

* NEPHROTOMA VIRESCENS Loew.

Fairly common; season, May 30 to August 17; reared from moss, Plummers Island, April 5, 1913, R. C. Shannon; seen ovipositing, Mount Vernon, Virginia, July 13, 1917, McAtee.

NEPHROTOMA XANTHOSTIGMA Loew.

Great Falls, Virginia, August 15, 1915, McAtee; Falls Church, Virginia, May 25, Glencarlyn, Virginia, June 20, Banks; June 8, 1918, McAtee; Hyattsville, Maryland, August 14, 1912, F. Knab; Eastern Branch near Benning, District of Columbia, August 29, 1915; Odenton, Maryland, July 29, 1917, McAtee.

Genus TIPULA Linnaeus.

KEY TO SPECIES.[1]

1. Wings with a distinct pubescence in the apical cells ..... 2.
   Wings entirely glabrous ..... 4.
2. Coloration bright shiny yellow, reddish and black; vertex shiny, with a black spot along the inner margin of each eye and a linear dark brown median area; thorax yellow with three shiny reddish stripes, the median one narrowly divided; male antennae very short, not attaining the wing base; pubescence of the wings confined to cell R_5. (Subgenus *Odontotipula* Alexander) ..... *T. (O.) unifasciata* (p. 403).
   Coloration dull brown and yellow; vertex opaque without black marks; praescutum dull, dark colored with paler stripes; male antennae elongate, reaching about to the base of the abdomen; pubescence of the wings more extensive, including cells R_3 to M_2. (Subgenus *Cinctotipula* Alexander ..... 3.
3. Antennal flagellum bicolorous; abdomen without distinct crossbands ..... *T. (C.) unimaculata* (p. 403).
   Antennal flagellum unicolorous; abdomen with the posterior half of each segment brown, the basal half more yellowish, producing a banded appearance ..... *T. (C.) algonquin* (p. 403).
4. Coloration as in the genus *Nephrotoma*, shiny, contrasting yellows and blacks ..... 5.
   Coloration dull brown, gray, yellow, or blackish, not at all shiny ..... 6.
5. Head orange yellow, the occiput with a grayish black spot; praescutum orange yellow with three dull gray-black stripes; posterior half of the postnotum and the apical half of the first abdominal segment light gray ..... *T. collaris* (p. 404).
   Head orange yellow, with a large brownish orange spot on each side of the vertex touching the inner margin of the eye; praescutum shiny, light honey yellow, with three shiny jet-black or reddish-black stripes; posterior margin of the postnotum and the apical half of the first abdominal segment not gray. (Regional) ..... *T. nobilis* (Loew).
6. Wings striped or streaked longitudinally with brown or reddish brown, this including the costal region and along *Cu;* cell *M* usually hyaline or nearly so; male hypopygium with the sclerites of the ninth segment fused into a continuous ring (*tricolor* group) ..... 7.
   Wings not striped or streaked as above, the costal margin darkened in some cases, but if so with no brown seams on the other veins ..... 13.
7. Wings with cell R_5 hyaline or nearly so, at least on its apical half, thus being continuous or nearly so with the area in cell *M* ..... 8.
   Wings with cell R_5 infuscated, concolorous with cells R_3 and M_1 ..... 11.
8. Large species, wing of the male over 20 mm.; base of cell R_5 darkened ..... 9.
   Smaller species, wing of the male under 18 mm.; cell R_5 hyaline ..... 10.

[1] No especial effort has been made in this paper to separate the females of this difficult and complex genus.

9. Large species, wing of male over 20 mm.....9*a*.
Smaller, wing of male under 20 mm.; antennae longer, bicolorous; praescutal stripes not distinctly margined with darker; wing pattern very pale, the whitish including almost all of cell *M* and all except the tips of cells M_1, M_2, and M_3; abdomen with the lateral stripes less distinct.....
T. strepens (p. 406).

9*a*. Antennal flagellum shorter, unicolorous dark brown; wings dark brown with cell 1st M. and the apical two-thirds of R_5 hyaline; the brown marking covers cells M_1 and M_2 Cu_1, and all but the extreme base of M_3; ninth tergite of male hypopygium with a powerful, slightly curved, claw-like horn on either side of the median lob.....*T. noveboracensis* (p. 406).
Antennal flagellum longer, indistinctly bicolorous; wings dark brown, with the hyaline areas including the basal half of cell *first* M_2, the bases of cells M_1, *second* M_2, and M_3, and the apical half of R_5; ninth tergite of male hypopygium without such horns subtending the median lobe.....
T. caloptera (p. 404).

10. Antennae short, with only the basal segments of the flagellum distinctly bicolorous; wing pattern more clear cut, the costal stripe broader and larker brown, vein *Cu* and the basal deflection of Cu_1 with a broad, dark brown seam.....*T. bella* (p. 404).
Antennae longer, with all except the terminal segments of the flagellum distinctly bicolorous; wing pattern less distinct and rather poorly defined, the brown seams and stripes much paler.....*T. cluta* (p. 404).

11. Wing pattern clear cut, the milky white obliterative streak proximad of the cord passes beyond cell *first* M_2 and almost reaches the posterior margin of the wing; male hypopygium without a pencil of setae on either side of the ninth tergite.....*T. fraterna* (p. 404).
Wing pattern more diffuse, the white obliterative streak ending in the extreme base of cell M_3.....12.

12. Coloration gray, the thoracic stripes darker; male hypopygium with a pencil of reddish setae on either side of the ninth tergite.....*T. tricolor* (p. 407).
Coloration reddish brown, the thoracic stripes reddish; male hypopygium without such a pencil of setae.....*T. sackeniana* (p. 406).

13. Costal margin of the wings dark brown; male hypopygium with the sclerites of the ninth segment fused into a continuous ring.....12.
Costal margin of the wings not dark brown.....15.

14. Wings with the brown costal margin including the base and the anterior parts of cells *R* and R_1; male hypopygium having the ninth tergite with a broad depressed median lobe.....*T. sayi* (p. 406).
Wings with the brown costal margin including cells *C* and *Sc* only; male hypopygium having the ninth tergite with a medium notch.....
T. cunctans (p. 404).

15. Wings strongly tinged with yellow; a brownish cloud at the end of vein *second A;* male hypopygium with the sclerites of the ninth segment fused into a continuous ring and the tergal region notched medially.....
T. ultima (p. 407).
Wings without a strong yellowish tinge; if suffused with yellowish, no brown cloud at end of vein *second A*.....16.

16. Wings spotted, banded, clouded or tipped with brown or gray.....17.
Wings unicolorous hyaline, yellowish or dark brown; in many cases, however, with the stigmal spot present; usually a pale, vitreous obliterative streak at or before the cord, extending from before the stigma to the region of cell *first* M_2 or beyond; in some cases the costal region is a little darkened, and perhaps a vitreous spot beyond the stigma in the base of cell R_2.....29.

17. Wings banded brown and white, with a broad, uninterrupted white crossband beyond the stigma, extending from the end of cell *second* R_1 to the middle of cell M_3, or beyond to the wing margin; antennal flagellum unicolorous ..... *T. trivittata* (p. 407).
Wings without such an uninterrupted white crossband beyond the stigma ..... 18.

18. Large, length of male over 25 mm.: vertex light yellow, thoracic dorsum with a velvety black pattern, margined with paler producing an ocellate appearance; abdominal tergites bright orange with a broad brownish black stripe on either side, segments 7 to 9 dark brownish black ..... *T. abdominalis* (p. 403).
Smaller, length of male usually under 20 mm.; not colored as above ..... 19.

19. Coloration bright orange, the thoracic dorsum without darker stripes; wings yellowish basally, more clouded with brown apically; male hypopygium assymetrical, the right pleurite produced caudad into a prominent two-cleft arm (male, *speciosa* Loew); the female is conspicuously different, the wings being dark brown, sparsely marked with white ..... *T. fuliginosa* (p. 405).
Coloration not as above ..... 20.

20. Male hypopygium with the ninth tergite produced caudad into a compressed median lobe; antennae elongate, bicolorous; wings with an extensive brownish gray blotch before the cord, occupying the ends of cells *R* and *M* and the lower basal angle of cell Cu_1 ..... *T. hermannia* (p. 405).
Male hypopygium not as above ..... 21.

21. Wings with a pale gray tinge, more brownish in cell *M* along vein *Cu;* hyaline spots in the anal cells, at two-thirds the length of cell *M*, before the stigma, and an interrupted band before the cord extending to cell *first* M_2; body coloration gray, male hypopygium small, not conspicuously elongated or enlarged (*fragilis* group) ..... 22.
Wings brown or dark gray, with a pattern of white or hyaline spots and blotches ..... 23.

22. Stripes on the praescutum ending at the level of the pseudosutural foveae, the intermediate pair blunt at their anterior ends; apical tergites of the abdomen not conspicuously darkened ..... *T. fragilis* (p. 404).
Intermediate stripes of the praescutum extending about to the anterior margin of the sclerite, each deeply bifid at its anterior end; apical tergites of the abdomen largely blackish ..... *T. ignobilis* (p. 405).

23. Male hypopygium with the ninth tergite elongate-cylindrical, strongly upturned; eighth sternite with the posterior margin tripartite and clothed with yellow hairs; wings with a veriegated brown, gray, and white pattern (*hebes* group) ..... 24.
Male hypopygium with the ninth segment not strongly upturned ..... 25.

24. Antennae of the male elongate, extending about to the base of the abdomen, bicolorous ..... *T. hebes* (p. 405).
Antennae short in both sexes, extending about to the wing root, yellowish brown ..... *T. grata* (p. 405).

25. Wings with the apex narrowly and irregularly darkened; narrow brown seams along the cord; antennae dark brown; praescutum gray with darker gray stripes, which are narrowly margined with dark brown; pleura clear light gray; ninth tergite of the male hypopygium with the posterior margin produced into two short, parallel lobes, one on either side of the median line ..... *T. iroquois* (p. 405).
Wings not colored as above ..... 26.

26. Wing apex infuscated; a dark spot at the origin of the sector; ninth tergite of the male hypopygium prominent, deeply notched, the lateral lobes acute ..... 26*a*.

Not as above; if the wing-pattern is as described (*valida* group), the size is much larger (wing of male 20 mm.) ..... 27.

26*a*. Ninth tergite with the lateral horns very long, tapering gradually to the acute tips; inner pleural appendage a narrow, flattened blade that runs out into a long acute point, the outer edge with a single, conspicuous ventral tooth; gonapophyses very long and delicate, sinuous..*submaculata* (p. 406).

Ninth tergite with the lateral horns short to very short, tapering abruptly to the acute tips; inner pleural appendage a short, flattened blade with the apex truncated or rounded and without a conspicuous ventral tooth; gonapophyses stouter, not sinuous..... *mallochi* (p. 406).

27. Large, wing of male 20 mm.; wings with apices light or dark brownish gray; male hypopygium greatly enlarged. (*valida* group.) ..... 28.

Smaller, wing of male under 18 mm.; wings with a heavy brown and white or gray and white pattern, female abdomen very long, the valves of the ovipositor serrated..... *T. longiventris* (p. 405).

28. Ninth tergite with the lateral lobes slender and produced; eighth sternite without a long brush of hairs; wing apex darker, brownish. (Regional.) *T. valida* Loew.

Ninth tergite with the lateral lobes shorter and less evident; eighth sternite with a tuft of long yellow hairs; wing apex light gray. (Regional.) *T. hirsuta* Doane.

29. Male light yellow, the thoracic stripes indistinct; antennae elongated, bicolorous; distal end of cell *1st* M_2 pointed; ninth tergite with a compressed median lobe; female conspicuously different, the body and wings brown; size very small, wing under 8 mm..... *T. annulicornis* (p. 403).

Characters not as above..... 30.

30. Antennae bicolorous, the basal enlargement of each segment of the flagellum yellow, the rest black..... *T. tephrocephala* (p. 407).

Antennae not as above..... 31.

31. Sclerites of the ninth segment of the male hypopygium fused into a nearly complete ring; caudal margin of the tergite with a broad, depressed median lobe; antennae bicolorous; legs very long..*T. perlongipes* (p. 406).

Sclerites of the ninth segment not fused, at least the tergite distinct; no such median projections on the tergite..... 32.

32. Ninth tergite large, the caudal margin with a small rounded notch on either side of a small, acute median tooth; eighth sternite with a broad, fleshy, lateral lobe on either side, directed proximal; median area of the sternite with a prominent chitinized tooth on either side of the median line; size large wing about 18 mm.; antennae bicolorous..... *T. umbrosa* (p. 407).

Ninth tergite not as described; eighth sternite, if with fleshy lobes (*australis*, *valida*) without two chitinized teeth on the median area..... 33.

33. Size large (wing over 20 mm.); male hypopygium greatly enlarged; eighth sternite with elongate lateral lobes and a flattened median lobe. (*valida* group.) ..... 34.

Size smaller, wing under 18 mm.; male hypopygium not greatly enlarged; eighth sternite not as above..... 35.

34. Ninth tergite with the lateral lobes slender; eighth sternite without a long brush of hairs. (Regional.) ..... *T. valida* Loew.

Ninth tergite with the lateral lobes short and blunt; eighth tergite with a brush of long yellow hairs. (Regional.)——*T. hirsuta* Doane.

35. Wing apex a little grayer than the basal cells of the wings; a brown spot at the origin of the sector; male hypopygium with the ninth tergite large, deeply split by a broad V-shaped notch, the lateral lobes acutely pointed—*T. submaculata* (p. 406).

Wing apex concolorous with the rest of the wing; ninth tergite otherwise——36.

36. Ninth tergite with the median area produced caudad into two parallel or divergent horns or lobes; coloration grayish, the pleura light blue-gray; size small, wing of the male about 12 mm——37.

The combination of characters otherwise; size larger, wing of the male over 15 mm——37.

37. Male hypopygium with the ninth tergite produced medially into two flattened divergent horns; outer pleural appendage elongate, conspicuous; inner pleural appendage short, broad——*T. dejecta* (p. 404).

Male hypopygium with the ninth tergite produced medially into two parallel lobes, the lateral angles of the sclerite produced caudad into blunt, minutely roughened lobes; outer pleural appendage inconspicuous, inner pleural appendage long, narrow——*T. aprilina* (p. 403).

38. Coloration of the thoracic pleura light gray; thoracic dorsum gray or grayish, with brown stripes——39.

Coloration of the thoracic pleura yellow, in some cases whitish pollinose; dorsum yellow or brown——40.

39. Antennae short, the flagellar segments deeply constricted beyond the basal enlargement; six brown stripes on the mesonotal praescutum; male hypopygium with the eighth sternite with four conspicuous lobes, an outer broad and flattened pair, the inner pair median in position——*T. australis* (p. 403).

Antennae longer, the flagellar segments not constricted beyond the basal enlargement; three brown stripes on the mesonotal praescutum; male hypopygium without lobes on the eighth sternite——*T. dietziana* (p. 404).

40. Nasus short; cell *1st* M_2 of the wings very small and pentagonal; male hypopygium with the ninth tergite tumid, unarmed or provided with horns (*bicornis* group)——41.

Nasus usually longer; cell *1st* M_2 of the wings not small and pentagonal; male hypopygium with the ninth tergite not tumid (*translucida* group)——43.

41. No horns on the ninth tergite——*T. johnsoniana* (p. 405).

Ninth tergite armed with horns——41.

42. Horns on the ninth tergite directed upward, or dorsad——*T. bicornis* (p. 404).

Horns on the ninth tergite directed laterad or slightly ventrad——*T. morrisoni* (p. 406).

43. Caudal margin of the ninth tergite with three prominent lobes, the median lobe acute; antennae bicolorous; body coloration light yellow, the thoracic stripes reddish brown; abdomen with a series of about four conspicuous, rounded brown spots along the sides——*T. triton* (p. 407).

Caudal margin of the ninth tergite not conspicuously trifid——44.

44. Caudal margin of the ninth tergite deeply notched, the lateral lobes produced into long, slightly curved horns; antennae bicolorous; body coloration yellowish, the thoracic stripes very indistinct; wings yellowish——*T. tuscarora* (p. 407).

Male hypopygium otherwise——45.

45. Caudal margin of the ninth tergite with a small median notch, the lateral lobes very broad and squarely truncated; antennae more or less distinctly bicolorous; coloration brownish yellow ..... *T. mingwe* (p. 406).
Male hypopygium otherwise ..... 46.
46. Lateral lobes of the ninth tergite of the male hypopygium pointed, close together ..... *T. translucida* (p. 406).
Lateral lobes of the ninth tergite bluntly rounded at their apices, the median area broad, highly convex to obtusely pointed ..... *T. georgiana* (p. 405).

The immature stages of species of the genus *Tipula* are spent in a variety of habitats. Some are practically aquatic (*T. abdominalis* and others), others live in dry garden soil (*T. bicornis*, *T. umbrosa* and others), and still other species live in decaying wood. A large number of the local species live in wet moss cushions.

Subgenus CINCTOTIPULA Alexander.

* TIPULA ALGONQUIN Alexander.

Virginia, near Plummers Island, July 28, 1912, F. Knab; Plummers Island, August 4, 1907, McAtee.

TIPULA UNIMACULATA Loew.

Plummers Island, July 5, 1912, in copula, E. A. Schwarz and H. S. Barber; July 21, 1915, McAtee; July 25, 1915, Alexander and McAtee; Rosslyn, Virginia, July 11, 1913, R. C. Shannon.

Subgenus ODONTOTIPULA.

* TIPULA UNIFASCIATA Loew.

Falls Church, Virginia, September 26, 1916, McAtee.

Subgenus TIPULA Linnaeus.

TIPULA ABDOMINALIS Say.

Frequent: August 8 to October 14, is attracted to light. P. I.

TIPULA ANNULICORNIS Say.

Maryland, near Plummers Island, August 2, 1914, McAtee; Beltsville, Maryland, July 6, Nathan Banks; August 8, 1915, McAtee.

* TIPULA APRILINA Alexander.

Great Falls, Virginia, May 2, 1917; Mount Vernon, Virginia, April 16, 1916; April 28, 1918; Beltsville, Maryland, May 13, 1917, McAtee.

TIPULA AUSTRALIS Doane.

Great Falls, Virginia, April 20, 1916; May 2, 1916; Plummers Island, April 28, 1915, McAtee; Maryland, near Plummers Island, April 20, 1916, L. O. Jackson; Beltsville, Maryland, April 30, 1916, McAtee; Washington, District of Columbia, Osten Sacken.

* TIPULA BELLA Loew.

Abundant; extreme dates of collection, April 15 and September 29; in copula, April 15, 18, May 2; is attracted to light. P. I.

TIPULA BICORNIS Forbes.

Forest Glen, Maryland, May 21, 26, 1914, at light, O. Heidemann; College Park, Maryland, May 25, 1913, F. Knab; Four-mile Run, Virginia, May 31, 1914, McAtee.

TIPULA CALOPTERA Loew.

Pimmit Run, Virginia, September 6, 1908, F. Knab; Plummers Island, June 8, 1913, McAtee; Cabin John Bridge, Maryland, May 20, 1903, W. V. Warner.

TIPULA COLLARIS Say.

Locally common in springy places during its rather short season, April 8 to 28; in copula, April 18. V. P. I.

TIPULA CUNCTANS Say.

An autumnal species; Ingleside, Virginia, October 14, 1917, Dead Run, Virginia, October 28, 1919, McAtee; Falls Church, Virginia, October 19, Banks; Rosslyn, Virginia, October 6, 1912, F. Knab; Plummers Island, October 9, 1906, McAtee; October 13, 1906, A. K. Fisher; Eastern Branch, District of Columbia, October 22, 1914, R. C. Shannon.

TIPULA DEJECTA Walker.

Another species that has been taken only in April, 6 to 25; in copula, 16; various localities in Virginia, and Plummers Island.

* TIPULA DIETZIANA Alexander.

Numerous in its season; April 2 to May 2; in copula, April 20 and 25; has been taken on plum flowers. P. I.

* TIPULA ELUTA Loew.

Frequent; dates of capture range from April 25 (in copula) to August 29. P. I.

* TIPULA FRAGILIS Loew.

The type specimen, a female, of *Tipula suspecta*, Loew, from the District of Columbia apparently is a *T. fragilis*, although possibly *T. ignobilis* Loew.

* TIPULA FRATERNA Loew.

Scotts Run, Virginia, July 25, 1915, Alexander and McAtee; Four-mile Run, Virginia, May 31, 1914, McAtee.

TIPULA FULIGINOSA Say.

The remarkable difference in coloration of the sexes of this species resulted in the male being described by Loew under the name of *T. speciosa*, and the two sexes being regarded as distinct species for many years. The identity of the two forms was indicated when two pupae collected by Messrs. Barber and Shannon, in débris beneath the nest of a turkey vulture, on Jacksons Island, Maryland, May 23, 1913, were bred and one produced a male *speciosa*, the other a female *fuliginosa*. A pair, in copula, collected near Cabin John Bridge, Maryland, June 10, 1917, by R. M. Fouts settled the identity of these forms. The species is fairly common, and dates of collection range from May 28 to June 30. P. I.

TIPULA GEORGIANA Alexander.

Beltsville, Maryland, May 24, 1917, McAtee.

* TIPULA GRATA Loew.

The lectotype was collected in the District of Columbia by Osten Sacken.

TIPULA HEBES Loew.

Frequent; season August 1 to September 7. P. I.

TIPULA HERMANNIA Alexander.

Cabin John Bridge, Maryland, June 9, September 14, 1915, R. C. Shannon; Oxon Run, Maryland, September 6, 1915; Beltsville, Maryland, September 3, 1916, McAtee.

* TIPULA IGNOBILIS Loew.

The lectotype was collected in the District of Columbia by Osten Sacken.

TIPULA IROQUOIS Alexander.

Great Falls, Virginia, April 20, 1913, C. P. Heinrich.

TIPULA JOHNSONIANA Alexander.

Plummers Island, Maryland, June 7, 13, 1914; Maryland near Plummers Island, June 2, 1916, McAtee.

TIPULA LONGIVENTRIS Loew.

Plummers Island, May 29, 1919, H. L. Viereck, June 8, 1914, E. A. Schwarz and H. S. Barber; Dead Run, Virginia, June 6, 1914, R. C. Shannon; Glencarlyn, Virginia, June 1, 1918, Mount Vernon, Virginia, June 4, 1916, McAtee; Washington, District of Columbia, May 18, 1903, W. V. Warner.

* TIPULA MALLOCHI Alexander.

Cabin John Run, Maryland, June 13, 1910, W. T. Davis.

* TIPULA MINGWE Alexander.

Common; season May 12 to August 28; is attracted to light. All specimens so far collected are from the Piedmont Plateau. P. I.

TIPULA MORRISONI Alexander.

Maryland near Plummers Island, May 24, 1914; Virginia near Plummers Island, June 2, 1916, June 2, 1918, Four-mile Run, Virginia, May 31, 1914; Mount Vernon, Virginia, June 4, 1916, Glencarlyn, Virginia, June 1, 1919, McAtee; Fort Washington, Maryland, May 26, 1896, C. W. Johnson.

TIPULA NOVEBORACENSIS Alexander.

Virginia near Plummers Island, April 20, 1919, McAtee.

TIPULA PERLONGIPES Johnson.

Great Falls, Virginia, July 21, 1919, McAtee; Falls Church, Virginia, June 21 1914, July 4, 1913, F. Knab; Rives, Maryland, June 14, 1916; in copula, L. O. Jackson: Beltsville, Maryland, June 16, 1912, McAtee.

* TIPULA SACKENIANA Alexander.

Difficult Run, Virginia, July 25, 1915, Alexander and McAtee; Falls Church, Virginia, September 26, 1915, Beltsville, Maryland, July 30, 1916, August 6, 1916, August 8, 1915; Odenton, Maryland, July 29, 1917, McAtee.

TIPULA SAYI Alexander.

Common; season August 17 to October 8; in copula, September 25. V. P. I.

TIPULA STREPENS Loew.

Great Falls, Virginia, May 23, 1918, McAtee; Bladensburg, Maryland, June 4, 1916, L. O. Jackson; Beltsville, Maryland, May 28, 1916, McAtee.

TIPULA SUBMACULATA Loew.

Common; dates of collection range from May 24 to July 4. All records from the Piedmont Plateau. P. I.

TIPULA TRANSLUCIDA Doane.

Plummers Island, June 19, 1913, at light, R. C. Shannon.

TIPULA TEPHROCEPHALA Loew.

Mount Vernon, Virginia, June 9, 1918, McAtee.

TIPULA TRICOLOR Fabricius.

Frequent; season from July 20 to September 6. P. I.

*** TIPULA TRITON Alexander.**

District of Columbia, Osten Sacken.

TIPULA TRIVITTATA Say.

Jacksons Island, May 22, 1913, at trap light, R. C. Shannon and H. S. Barber; Plummers Island, May 31, 1908, June 23, 1907, McAtee; Washington, District of Columbia, June 6, 1913, R. C. Shannon; Beltsville, Maryland, May 28, 1916, McAtee.

*** TIPULA TUSCARORA Alexander.**

Glencaryln, Virginia, June 21, F. Knab; Washington, District of Columbia, no date.

TIPULA ULTIMA Alexander.

Common in autumn, September 5 to October 30, emerging in numbers on latter date, however, and frequent in copula; comes to light. V. P. I.

TIPULA UMBROSA Loew.

Frequent, May 18 to July 13.

Tribe LIMNOBIINI.

KEY TO GENERA.

1. Rostrum elongated, longer than the head and thorax taken together_____ *Geranomyia* (p. 408.)
   Rostrum not elongated, shorter than the head_____2.
2. A supernumerary crossvein in cell *first A*, connecting the two anal veins_____ *Discobola* (p. 408).
   No supernumerary crossvein in cell *first A*_____3.
3. Often with a supernumerary crossvein in cell *Sc;* antennae of the male bi–uni–, or sub-pectinate_____ *Rhipidia* (p. 409).
   No supernumerary crossvein in cell *Sc* (excepting a weak one in *Dicranomyia simulans*); antennae of the male not pectinate_____4.
4. *Sc* usually short, ending opposite the origin of *Rs;* claws with usually but a single tooth on the lower side; ventral pleural appendage of the male hypopygium a fleshy lobe_____ *Dicranomyia* (p. 410).
   Sc always elongate, ending far beyond the origin of the sector; *r* often considerably removed from the tip of *R*; claws with usually two or three teeth on the lower side; ventral pleural appendage of the male hypopygium horny_____ *Limnobia* (p. 412).

Genus GERANOMYIA Haliday.

KEY TO SPECIES.

1. Wings heavily spotted with dark brown; tips of the tibiae black_____
G. rostrata (p. 408).
Wings unmarked or with only pale indistinct seams along the cord_____2.
2. *Sc* short, ending opposite or just beyond the origin of *Rs;* crossveins and deflections of veins faintly seamed with darker. (Regional.)_____
G. diversa Osten Sacken.
Sc long, ending at about midlength of *Rs;* wings unmarked except for the stigma spot_____3.
3. Body coloration yellow; wings with the stigma pale; legs dull yellow, the femora not darkened at their tips_____*G. distincta* (p. 408).
Body coloration yellowish brown, darkest on the scutal lobes and the postnotum; wings with the stigma oval, dark brown, well defined; legs brownish yellow, the femora brown at the tips____*G. canadensis* (p. 408).

The adult flies of this genus feed on various flowers, especially the Compositae and Umbelliferae. The immature stages were until very recently quite unknown. In 1918 Mr. J. R. Malloch found the larvae and pupae at Urbana, Illinois. The larvae are acquatic with habits very similar to *Dicranomyia simulans*, living in silt-covered tubes on the exposed faces of rocks over which a thin sheet of water pours continuously.

GERANOMYIA CANADENSIS Westwood.

Plate 23, fig. 2.

Common; dates of collection range from May 2 to October 26; found upon flowers of *Aster*, *Solidago*, *Verbesina alternifolia* and *Eupatorium ageratoides*. P. I.

GERANOMYIA DISTINCTA Doane.

Beltsville, Maryland, June 20, 1910, June 23, 1918, McAtee.

GERANOMYIA ROSTRATA Say.

Frequent; season May 1 to October 7, known to visit flowers of *Verbesina* and *Eupatorium*. P. I.

Genus DISCOBOLA Osten Sacken.

The immature stages of members of this genus live beneath the bark of trees, especially of conifers.

DISCOBOLA ARGUS Say.

Dead Run, Virginia, May 23, 1915, R. C. Shannon; Virginia near Plummers Island, October 28, 1905, H. S. Barber; Rosslyn, Virginia, October 6, 1912, F. Knab; Plummers Island, July 21, 1912, McAtee; Washington, District of Columbia, August 28, Nathan Banks.

Genus RHIPIDIA Meigen.

KEY TO SPECIES.

1. Wings with an abundant pale brown or gray dotting in all the cells ..... 2.
   Wings with the markings larger and confined to the vicinity of the veins ..... 3.
2. Body coloration grayish, the praescutum with a broad black median line; postnotum gray; wings with a heavy brown pattern along the costal margin, these marks about equal in extent to the interspaces; legs brown; male antennae bipectinate ..... *R. maculata* (p. 409).
   Body coloration yellowish brown, the praescutum without a broad black median line; postnotum black; wings with small black spots at the base, on the subcostal crossvein, origin of the sector and the stigma, these marks much smaller than the interspaces; legs yellow; male antennae subpectinate ..... *R. shannoni* (p. 410).
3. Praescutum reddish brown with narrow black lines; pleura dull yellow with two narrow blackish longitudinal stripes; antennae with segments 12 and 13 light yellowish; basal deflection of *Cu* usually far before the fork of *M;* antennae of the male subpectinate ..... *R. domestica* (p. 409).
   Praescutum gray with a broad black median line; pleura grayish or plumbeous, unstriped; antennae black throughout; basal deflection of Cu_1 at the fork of *M;* antennae of the male not subpectinate ..... 4.
4. Wings with the dark pattern beyond the origin of the sector only, a large rounded cloud at the origin and the fork of the sector, the large rectangular stigmal blotch and the radial cells largely darkened; abdomen dark brown, the genitalia reddish yellow; antennae of the male unipectinate ..... *R. fidelis* (p. 409).
   Wings with a series of about five large grayish brown blotches along the costal margin, two being before the origin of the sector; abdominal tergites yellow, the posterior half of each segment dark brown; antennae of the male bipectinate ..... *R. bryanti* (p. 409).

The immature stages are spent beneath the bark of trees (*R. bryanti*, *R. fidelis*) or in decaying animal or vegetable matter.

RHIPIDIA BRYANTI Johnson.

Plummers Island, September 4, 1904, E. A. Schwarz and H. S. Barber; Washington, District of Columbia, adult emerged May 18 from pupa collected May 11, 1913, by R. C. Shannon.

* RHIPIDIA DOMESTICA Osten Sacken.

Common; dates of collection range from February 17 to October 28; is often attracted to light. P. I.

RHIPIDIA FIDELIS Osten Sacken.

Washington, District of Columbia, August 28, 1882.

RHIPIDIA MACULATA Meigen.

Frequent; season, July 26 to October 27; comes to light. P. I.

* RHIPIDIA SHANNONI Alexander.

Great Falls, Virginia, October 21, Nathan Banks; Dead Run, Virginia, October 28, 1919, McAtee; Plummers Island, May 19, 26, 1914, at light, June 14, 1913, July 4, 1913, R. C. Shannon; July 21, September 5, October 22, 1915, September 13, 1914, McAtee; August 8, 18, 1912, J. R. Malloch; Cabin John, Maryland, August 30, F. Knab.

Genus DICRANOMYIA Stephens.

KEY TO SPECIES.

1. Wings very long and narrow, lanceolate----------*D. longipennis* (p. 412).
   Wings broad, not lanceolate----------2.
2. *Sc* ending opposite, or before, or but slightly beyond the origin of the sector----------3.
   Sc ending far beyond the origin of the sector----------13.
3. Antennae with at least the basal segments pale----------4.
   Antennae with the segments dark throughout----------7.
4. Cell *first* M_2 open, the *m* cross-vein lacking----------6.
   Cell *first* M_2 closed----------5.
5. Flagellum of the antenna and the halteres pale----------*D. pudica* (p. 412).
   Flagellum of the antenna and the halteres brown----------*D. diversa* (p. 411).
6. Praescutum with a single brown stripe; dorsal pleural appendage of the male hypopygium a short hook----------*D. immodesta* (p. 412).
   Praescutum with three brown stripes; dorsal pleural appendage of the male hypopygium a strong, saberlike hook which touches its mate of the opposite side----------*D. gladiator* (p. 411).
7. Cell *first* M_2 open; *Sc* far before the origin of *Rs* due to the shortness of the latter, which is about equal to the basal deflection of R_{4+5}----------*D. brevirena* (p. 411).
   Cell *first* M_2 closed; *Sc* nearly opposite the origin of *Rs*, which is much longer than the basal deflection of R_{4+5}----------8.
8. Thorax shining black, the pleura with a grayish pruinosity----------*D. morioides* (p. 412).
   Thorax not shining black; gray, brown, or yellowish brown----------9.
9. Femora brown with the tips broadly yellow; wings marked with brown along the veins----------*D. badia* (p. 411).
   Femora not banded with yellow; wings unmarked or nearly so----------10.
10. Sc_1 much longer than Sc_2, being nearly, if not quite, the length of the stigma----------*D. distans* (p. 411).
    Sc_1 short, not more than one-half the length of the stigma----------11.
11. Coloration gray, the praescutum with a broad median brown stripe; a narrow brown seam on *r*----------*D. liberta* (p. 412).
    Coloration brown or yellowish brown; no narrow brown seam on *r*----------12.
12. The basal deflection of M_{1+2}, forming the inner end of cell *first* M_2, is arcuated so that cells *first* M_2 and R_3 are almost on a line----------*D. stulta* (p. 412).
    The basal deflection of M_{1+2} is not conspicuously arcuated, cell *first* M_2 being conspicuously more distant from the wing base than cell R_3----------*D. hacretica* (p. 412).
13. Wings spotted with darker----------14.
    Wings unmarked, except for the stigmal spot when present----------15.

14. Wings with brown dots in all the cells; femora with a yellowish ring before the tip ..... *D. simulans* (p. 412).
    Wings with three large brown spots along the costa, the first at the origin of *Rs*, the second at the tip of *Sc*, the third at the tip of R_1; wings grayish brown, paler near the stigma; cord and outer end of cell *first* M_2 seamed with dark brown; femora without a yellowish ring before the tip ..... *D. rara* (p. 412).
15. Wings with a distinct pubescence on the apical cells ..... *D. pubipennis* (p. 412).
    Wings glabrous throughout ..... 16.
16. No stigmal spot, nor brown seams to the veins; R_1 curved strongly toward R^{2+3} at the tip; tarsi brown ..... *D. globithorax* (p. 411).
    Stigma evident, dark brown; paler brown seams to the cord and the outer end of cell *first* M_2; R_1 not incurved toward R^{2+3}; tarsi whitish ..... *D. macateei* (p. 412).

The immature stages are spent beneath decaying bark (*D. macateei*, *D. rara*), in moss cushions, or in water (*D. simulans*).

DICRANOYMIA BADIA Walker.

Common about springs and small streams; dates of collection range from February 21 to October 28; in copula, March 17, April 12. V. P. I.

* DICRANOYMIA BREVIVENA Osten Sacken.

Washington, District of Columbia, October 14, 1906, McAtee.

DICRANOYMIA DISTANS Osten Sacken.

Great Falls, Virginia, October 21, Nathan Banks: Dead Run, Virginia, April 20, 1913; Maywood, Virginia, October 16, 1915, at light, McAtee; Rosslyn, Virginia, October 6, 1912, F. Knab; Plummers Island, August 5, 1913, R. C. Shannon; November 24, 1901, H. S. Barber; Washington, District of Columbia, August 15, 1907, McAtee; Falls Church, Virginia, June 16, Nathan Banks.

* DICRANOYMIA DIVERSA Osten Sacken.

Washington, District of Columbia, April 15, August 15, September 9, 1907, McAtee.

DICRANOYMIA FLORIDANA Osten Sacken.

Washington, District of Columbia, November 30, 1907; Plummers Island, November 17, 1907, McAtee.

* DICRANOYMIA GLADIATOR Osten Sacken.

Beltsville, Maryland, October 7, 1917, McAtee.

* DICRANOYMIA GLOBITHORAX Osten Sacken.

Bellview to Difficult Run, Virginia, October 3, 1915, Virginia near Plummers Island, September 29, 1915, McAtee; Rosslyn, Virginia, July 7, 1912, F. Knab.

DICRANOYMIA HAERAETICA Osten Sacken.

Glencarlyn, Virginia, June 4, 11, 1911, F. Knab.

* DICRANOYMIA IMMODESTA Osten Sacken.

Common; season May 1 to October 25; comes to light. P. I.

* DICRANOYMIA LIBERTA Osten Sacken.

Very common; dates of collection range from April 22 to October 25; is frequently attracted to light. P. I.

DICRANOYMIA LONGIPENNIS Schummel.

Beltsville, Maryland, October 22, 1915, McAtee.

* DICRANOYMIA MACATEEI Alexander.

Great Falls, Va., August 11, 1915, October 3, 1915; Dead Run, Virginia, May 10, 1916, July 14, 1915; Plummers Island, Maryland, May 24, 1914, McAtee.

DICRANOYMIA MORIOIDES Osten Sacken.

Dead Run, Virginia, May 21, 1914, R. C. Shannon; Cabin John Bridge, Maryland, May 16, 1909, F. Knab.

* DICRANOYMIA PUBIPENNIS Osten Sacken.

Common along streams; season, April 20 to October 3. V. P. I.

DICRANOYMIA PUDICA Osten Sacken.

Falls Church, Virginia, May 21, N. Banks.

DICRANOYMIA RARA Osten Sacken.

Common; season May 23 to October 23; bred from rotten willow, Plummers Island, June 15, 1914, H. S. Barber.

DICRANOYMIA SIMULANS Walker.

Common along Piedmont streams, May 5 to November 23. P. I.

DICRANOYMIA STULTA Osten Sacken.

Glencarlyn, Virginia, June 17, 1917, Laurel, Maryland, May 30, 1919, McAtee.

Genus LIMNOBIA Meigen.

KEY TO SPECIES.

1. Cross vein *r* at the tip of R_1 ..... 2.
   Cross vein *r* removed from the tip of R_1 ..... 5.
2. Knobs of the halteres black ..... 3.
   Knobs of the halteres pale at the tips ..... 4.
3. Femora yellow, the extreme tips narrowly dark brown; wings yellowish with three eye-like markings ..... *L. triocellata* (p. 413).
   Femora with a brown band before the dark tips; pattern of the wings not ocellate; a row of small dark brown spots in cell R ..... *L. fallax* (p. 413).

4. Femora with three brown bands ..... *L. immatura* (p. 413).
   Femora with two brown bands ..... *L. cinctipes* (p. 413).
5. Wings with conspicuous brown clouds and seams ..... *L. indigena* (p. 413).
   Wings almost clear, only three or four tiny brown dots along the costal margin ..... *L. tristigma* (p. 413).

The immature stages are fungicolous (*L. triocellata*), mud inhabitants (*L. fallax*, and others), live in decaying vegetable matter (*L. indigena*) or in decaying wood.

LIMNOBIA CINCTIPES Say.

Great Falls, Virginia, April 20, 1916, October 3, 1915, McAtee; Plummers Island, August 13, 1912, October 10, 1904, E. A. Schwarz and H. S. Barber; Washington, District of Columbia, Osten Sacken.

LIMNOBIA FALLAX Johnson.

Glencarlyn, Virginia, July 11, Nathan Banks.

* LIMNOBIA IMMATURA Osten Sacken.

Great Falls, Virginia, October 4, 1916, McAtee; Plummers Island, May 14, 1914, at light, R. C. Shannon; June 30, 1912, McAtee; Maryland near Plummers Island, August 5, 1914, R. C. Shannon; Maywood, Virginia, October 22, 1915, McAtee.

* LIMNOBIA INDIGENA Osten Sacken.

Falls Church, Virginia, May 24, Nathan Banks; June 7, 1914, R. C. Shannon; July 7, 1912, Nathan Banks; Spring Hill, Virginia, September 21, 1911, F. Knab; Forest Glen, Maryland, May 30, 1914, McAtee.

* LIMNOBIA TRIOCELLATA Osten Sacken.

Abundant; extreme dates of collection, May 28 and October 29; reared from mushrooms, among which are *Clytocybe* species and *Boletus felleus*. P. I.

LIMNOBIA TRISTIGMA Osten Sacken.

Dead Run, Virginia, June 29, 1915, R. C. Shannon.

Tribe ANTOCHINI.

KEY TO GENERA.

1. Rostrum elongated, at least as long as the head ..... 2.
   Rostrum shorter than the head ..... 4.
2. Rostrum about as long as the head or a very little longer ..... *Rhamphidia* (p. 414).
   Rostrum about as long as the body ..... 3.
3. *Rs* with two branches reaching the wing margin ..... *Elephantomyia* (p. 414).
   Rs reaching the wing margin unbranched ..... *Toxorhina* (p. 414).
4. Crossvein *r* lacking ..... *Ptilorhina* (p. 415).
   Crossvein *r* present 5

5. Anal angle of the wing prominent, almost square; *Rs* very elongate, straight; basal deflection of Cu_1 before the fork of *M*_____*Antocha* (p. 415).
Anal angle of the wing feeble; *Rs* shorter, more arcuated; basal deflection of Cu_1 at or beyond fork of *M*_____6.
6. R_1 beyond the tip of *Sc* long, longer than the sector alone; veins issuing from cell *first* M_2 very long_____*Dicranoptycha* (p. 415).
R_1 beyond the tip of *Sc* short, less than the length of the sector alone; veins issuing from cell *first* M_2 alone_____*Teucholabis* (p. 416).

Genus RHAMPHIDIA Meigen.

KEY TO SPECIES.

1. Rostrum short; legs yellow, the tips of the femora and the tibiae black; wings tipped with dusky_____*R. flavipes* (p. 414).
Rostrum long; legs uniformly dark brown; wings uniformly subhyaline, not tipped with dusky_____*R. mainensis* (p. 414).

The larvae of these species are semiaquatic in their habits.

RHAMPHIDIA FLAVIPES Macquart.

Plate 23, fig. 3.

Frequent; season May 19 to August 29; often attracted to light. P. I.

* RHAMPHIDIA MAINENSIS Alexander.

Hyattsville, Maryland, September 1, 1912, J. R. Malloch.

Genus ELEPHANTOMYIA Osten Sacken.

ELEPHANTOMYIA WESTWOODI Osten Sacken.

Several records from Piedmont localities; June 5 to August 23. The curious golden-yellow larva lives beneath the damp bark of fallen trees; here the fly has been bred from a rotten willow log. P. I.

Genus TOXORHINA Loew.

KEY TO SPECIES.

1. Cell *first* M_2 closed; body coloration brownish yellow; size larger, wing about 6.5 mm. (Regional.) _____*T. magna* Osten Sacken.
2. Cell *first* M_2 open by the atrophy of *m* (closed in abnormal specimens only); body coloration gray; size smaller, wing less than 5.5 mm_____*T. muliebris* (p. 414).

TOXORHINA MULIEBRIS Osten Sacken.

The adult is usually found on flowers; Beltsville, Maryland, June 14, 1914; July 9, 1916; August 8, 1913, common on flowers of *Clethra alnifolia;* August 15, 1909, on flowers of *Solidago canadensis* (the last specimens recorded by Knab as *Geranomyia diversa*). McAtee; Great Falls, Virginia, on flowers of *Ceanothus*, Nathan Banks; Glencarlyn to mouth of Four-mile Run, Virginia, on flowers of *Apocynum medium*, June 11, 1916, McAtee.

Genus ATARBA Osten Sacken.

ATARBA PICTICORNIS Osten Sacken.

Common; season May 16 to August 9; in copula, June 24; is attracted to light; the immature stages are unknown. P. I.

Genus ANTOCHA Osten Sacken.

* ANTOCHA SAXICOLA Osten Sacken.

Abundant; dates of collection range from April 20 to September 24; in copula, April 23, May 4; is attracted to light; the immature stages are strictly aquatic. P. I.

Genus DICRANOPTYCHA Osten Sacken.

KEY TO SPECIES.

1. Wings with a strong reddish-brown or fulvous tinge; *Rs* notably longer than cell *first* M_2. (Regional.)——*D. germana* Osten Sacken.
   Wings not strongly fulvous; *Rs* approximately as long as cell *first* M_2——2.
2. Tips of the femora conspicuously blackened; abdominal tergites uniformly light brown or yellow——3.
   Tips of the femora not blackened; abdominal tergites banded or at least the seventh segment blackish——4.
3. Size large (male, length, about 10 mm.); wings brownish yellow; male hypopygium with the gonapophyses prominent, acicular. (Regional.)——*D. nigripes* Osten Sacken.
   Size small (male, length, under 8 mm.); wings brown; male hypopygium with the gonapophyses small, not projecting. (Regional.)——*D. minima* Alexander.
4. Coloration yellow, the wings deep yellow——*D. winnemana* (p. 415).
   Coloration brown or gray; wings pale brownish or grayish——5.
5. Abdominal tergites uniformly dark brown or only the seventh segment darker; male hypopygium with the gonapophyses not acicular nor projecting——*D. sobrina* (p. 415).
   Abdominal tergites banded, the apical third of each segment pale; male hypopygium with the gonapophyses acicular, prominent. (Regional.)——*D. tigrina* Alexander.

The immature stages are spent in rather dry soil beneath leaf mold.

* DICRANOPTYCHA SOBRINA Osten Sacken.

Abundant; season April 20 to September 5; in copula, May 28, August 22; comes to light. P. I.

* DICRANOPTYCHA WINNEMANA Alexander.

Plate 23, fig. 4.

Plummers Island, July 21, 1915; Virginia, near Plummers Island, August 22, 1916, McAtee.

Genus TEUCHOLABIS Osten Sacken.

KEY TO SPECIES.

1. Wing over 6 mm.; wings broad; *Sc* long, ending beyond two-thirds the length of the sector; *r* inserted on R_{2+3}; vein R_{2+3} not upturned at its tip, the end of cell *second* R_1 being much broader than the end of cell R_3; praescutum reddish, with three black stripes ..... *T. complexa* (p. 416).
   Smaller, wing under 5 mm.; wings narrow; *Sc* short, ending before midlength of the sector; *r* inserted at or near the end of *Rs;* vein R_{2+3} upturned at the tip, the end of cell R_3 being broader than the end of cell *second* R_1; praescutum shiny black, only the humeral parts of the sclerite light yellow ..... *T. lucida* (p. 416).

The immature stages, as known, are spent beneath the bark of trees.

* TEUCHOLABIS COMPLEXA Osten Sacken.

Frequent in Piedmont localities; May 30 to August 28. P. I.

* TEUCHOLABIS LUCIDA Alexander.

Plate 23, fig. 5.

Dalecarlia Reservoir, District of Columbia, August 22, 1915, McAtee.

Tribe ERIOPTERINI.

KEY TO GENERA.

1. Three branches of media reaching the wing margin ..... *Cladura* (p. 417).
   Two branches of media reaching the wing margin ..... 2.
2. R_2 shorter than R_{2+3} ..... 3.
   R_2 longer than R_{2+3} ..... 4.
3. Cross vein *r* present; tuberculate pits retreated backward to near midlength of the praescutum ..... *Erioptera* (subgenus *Empeda*) (p. 417).
   Cross vein *r* lacking; tuberculate pits located on the anterior part of the praescutum ..... *Gonomyia* (p. 420).
4. *Rs* ending in cell R_2 ..... *Molophilus* (p. 419).
   Rs ending in cell R_3 ..... 5.
5. A supernumerary cross vein in cell R_2; *second Anal* vein strongly bisinuate ..... *Helobia* (p. 420).
   No supernumerary cross vein in cell R_2; *second Anal* vein not bisinuate ..... 6.
6. Cu_1 tending to turn toward the wing apex; forks of the longitudinal veins very long and deep ..... *Erioptera* (p. 417).
   Cu_1 straight or tending to turn away from the wing apex ..... 7.
7. Sc_2 not far removed from the tip of Sc_1; coloration of local species deep black ..... *Gnophomyia* (p. 422).
   Sc_2 retreated toward the base of the wing so that Sc_1 is usually more than two-thirds the length of the sector ..... 8.
8. Wings glabrous; last three segments of the antennae abruptly smaller than the others ..... *Trimicra* (p. 422).
   Wings pubescent; antennal segments gradually lessening in size toward the tip of the organ ..... *Ormosia* (p. 422).

Genus CLADURA Osten Sacken.

*** CLADURA FLAVOFERRUGINEA Osten Sacken.**

Abundant; collected from October 6 to November 17; is attracted to light. P. I.

Genus ERIOPTERA Meigen.

KEY TO SPECIES.

1. Cell *first* M_2 open by the atrophy of the outer deflection of M_3 (subgenus *Mesocyphona* Osten Sacken)——2.
   Cell *first* M_2 usually closed; if open it is by the atropy of *m*——4.
2. Wings pale gray with small brown dots at the tips of the veins along the wing margin——*E.* (*M.*) *parva* (p. 419).
   Wings grayish or brown, with whitish dots or spots——3.
3. Wings with abundant white dots in all the cells; each femur with two brown rings——*E.* (*M.*) *caloptera* (p. 418).
   Wings with about 20 large white spots that are confined to the region of the veins; each femur with a single brown ring before the tip——*E.* (*M.*) *needhami* (p. 419).
4. Cell *first* M_2 open by the atrophy of *m;* second anal vein arcuated, before its tip bent suddenly toward the first, so that cell *first A*, at its middle is about as broad or broader than at the margin (subgenus *Erioptera* Meigen)——5.
   Cell *first* M_2 usually closed; anal veins divergent——12.
5. Knobs of the halteres dark brown——*E.* (*E.*) *septemtrionis* (p. 419).
   Knobs of the halteres pale——6.
6. Wings yellowish, some of the cross veins and deflections of veins with tiny brown dots——*E.* (*E.*) *chrysocoma* (p. 418).
   Wings yellowish or green, unmarked——7.
7. Thorax reddish, the humeral region of the mesonotum yellowish——*E.* (*E.*) *vespertina* (p. 419).
   Thorax yellow or light green——8.
8. Color of the body and wings light yellow——*E.* (*E.*) *straminea* (p. 419).
   Color of the body and wings light green——9.
9. Male hypopygium with the two pleural appendages simple; eyes of the male very large; female ovipositor with the ventral margin of the tergal valves finely serrate. (Regional)——*E.* (*E.*) *chlorophylloides* Alexander.
   Male hypopygium with the ventral pleural appendage with a spine before the tip; female ovipostor longer, almost straight and the ventral margins of the tergal valves smooth——10.
10. Spine on the ventral pleural appendage very long so the appendage appears almost evenly forked at its tip——*E.* (*E.*) *furcifer* (p. 418).
    Spine on the ventral pleural appendage smaller——11.
11. Spine on the ventral pleural appendage located at the tip of the appendage; gonapophyses shaped like flattened paddles with the outer margin minutely serrated. (Regional)——*E.* (*E.*) *subchlorophylla* Alexander.
    Spine on the ventral pleural appendage small, located before the tip of the appendage; gonapophyses ending in a laterally directed chitinized horn. (Regional)——*E.* (*E.*) *chlorophylla* Osten Sacken.

12. Cell R_2 short, about as long as R_{2+3} alone (subgenus *Empeda* Osten Sacken) ... *E.* (*E.*) *noctivagans* (p. 419).
    Cell R_2 deep, much longer than R_{2+3} alone ... 13.
13. A stump of a vein in cell *first* M_2; no brown bands on the femora (subgenus *Hoplolabis* Osten Sacken) ... *E.* (*H.*) *armata* (p. 418).
    No stump of a vein in cell *first* M_2; femora banded with brown (subgenus *Acyphona* Osten Sacken) ... 14.
14. Wings with a broad brown band at the cord and a large brown basal spot ... *E.* (*A.*) *venusta* (p. 419).
    Wings not so marked ... 15.
15. Coloration of body and wings more yellowish; an uninterrupted brown band along the cord; brown bands on the femora less extensive, the yellow area between them broad; basal deflection of Cu_1 at the fork of M ... *E.* (*A.*) *armillaris* (p. 418).
    Coloration of body and wings more brownish, the markings on the wings less extensive and the band along the cord interrupted; bands on the femora very extensive, the yellowish area between them very narrow; basal deflection of Cu_1 before the fork of M ... *E.* (*A.*) *graphica* (p. 419).

The immature stages are spent in wet earth along the banks of streams or other bodies of water.

* ERIOPTERA ARMATA Osten Sacken.

Common; season April 26 to September 6; has been collected on flowers of wild plum. P. I.

* ERIOPTERA ARMILLARIS Osten Sacken.

Hyattsville, Maryland, August 3, 1912, F. Knab; Eastern Branch near Benning, District of Columbia, August 29, 1915, McAtee; Great Falls, Virginia, October 21, Nathan Banks.

ERIOPTERA CALOPTERA Say.

Abundant; extreme dates of collection May 8 and September 23; often comes to light. P. I.

* ERIOPTERA CHRYSOCOMA Osten Sacken.

Dead Run, Virginia, June 6, 1914, R. C. Shannon; Beltsville, Maryland, June 23, 1918, McAtee.

* ERIOPTERA FURCIFER Alexander.

Common; season June 9 to August 3; is attracted to light. P. I.

* ERIOPTERA GRAPHICA Osten Sacken.

Plummers Island, July 9, 1916, H. L. Viereck; July 14, 1912; Little Falls, District of Columbia, August 22, 1915; Beltsville, Maryland, July 10, 1909, McAtee.

ERIOPTERA NEEDHAMI Alexander.

Plummers Island, August 9, 1915, at light, R. C. Shannon; Little Falls, District of Columbia, August 22, 1915, McAtee; Pimmit Run, Virginia, September 6, 1908, F. Knab; Eastern Branch near Bennings, District of Columbia, August 29, 1915; Oxon Run, Maryland, September 6, 1915, McAtee.

* ERIOPTERA NOCTIVAGANS Alexander.

Maywood, Virginia, October 19, 1915, at light, McAtee.

* ERIOPTERA PARVA Osten Sacken.

Fairly common; season July 25 to September 23; comes to light. V. P. I.

* ERIOPTERA SEPTEMTRIONIS Osten Sacken.

Common: collected from July 14 to October 19; often attracted to light. P. I.

ERIOPTERA STRAMINEA Osten Sacken.

Plummers Island, July 9, 1902, H. S. Barber; Maryland near Plummers Island, June 5, 1903, W. V. Warner.

ERIOPTERA VENUSTA Osten Sacken.

Common; has been collected from May 13 to October 4; comes to light. V. P. I.

* ERIOPTERA VESPERTINA Osten Sacken.

Difficult Run, Virginia, July 25, 1915, Alexander and McAtee; Washington, District of Columbia, September 23, 1906; Hyattsville, Maryland, August 2, 1908, F. Knab.

Genus MOLOPHILUS Curtis.

KEY TO SPECIES.

1. Size very small; wing about 2.5 mm.; basal deflection of R^{2+3} short, perpendicular, about as long as the radial cross vein; basal deflection of Cu_1 far before the fork of M ..... *M. ursinus* (p. 420).
   Size larger, wing over 2.6 mm.; basal deflection of R^{2+3} longer, oblique; basal deflection of Cu_1 near the fork of M (in *nova-caesariensis*) or beyond it on M_3 ..... 2.
2. Wings with a brownish cloud on the basal deflection of M_3 (Regional.) ..... *M. comatus* (Doane).
   Wings without such a brown spot ..... 3.
3. Antennae of the male elongated; coloration largely yellowish ..... *M. pubipennis* (p. 420).
   Antennae short in both sexes; coloration black or brown ..... 4.

4. Size small, wing under 3.5 mm.; basal deflection of *Cu*1 near the fork of *M*; base of the femora yellow, passing into black-M. *nova-caesariensis* (p. 420).
Size larger, wing over 4 mm.; basal deflection of *Cu*1 beyond the fork of *M* on *M*3; base of the femora not conspicuously brightened----------5.
5. Antennae dark colored; body coloration grayish brown----------
M. hirtipennis (p. 420).
Antennae with the basal segments pale; body coloration; pale brown. (Regional)----------*M. forcipula* (Osten Sacken).

The immature stages are spent in moist earth.

* MOLOPHILUS HIRTIPENNIS Osten Sacken.

Virginia near Plummers Island, Maryland, June 2, 1916, McAtee; Dead Run, Virginia, June 6, 1914; Maryland near Plummers Island, October 10, 1914, at light, R. C. Shannon; Lakeland, Maryland, September 25, 1909, F. Knab.

MOLOPHILUS NOVA-CAESARIENSIS Alexander.

Beltsville, Maryland, May 28, 1916; Dyke, Virginia, May 28, 1915, McAtee; Falls Church, Virginia, June 30, Nathan Banks. These specimens are more highly colored than the somewhat faded type specimen from New Jersey; the legs are jet black with the coxae, trochanters and femoral bases yellow.

* MOLOPHILUS PUBIPENNIS Osten Sacken.

Common; extreme dates of collection, May 29 and September 6; is attracted to light. P. I.

* MOLOPHILUS URSINUS Osten Sacken.

Plate 23, fig. 7.

Described from specimens collected at Washington, in spring.

Genus HELOBIA St. Fargeau and Serville.

HELOBIA HYBRIDA Meigen.

Common; extreme dates of capture, February 28 and October 22; has been collected on flowers of *Anthemis cotula;* the immature stages are spent in damp earth. P. I.

Genus GONOMYIA Meigen.

KEY TO SPECIES.

1. Two branches of the sector reaching the wing margin (subgenus *Leiponeura* Skuse) ----------2.
Three branches of the sector reaching the wing margin (subgenus *Gonomyia* Meigen)----------3.

2. Outer deflection of vein M_3 lacking, cell *first* M_2 being open; costa china white; legs banded with white. (Regional.)
G. (*L.*) *alexanderi* Johnson.
Outer deflection of vein M_3 present, closing the cell *first* M_2; coloration not as above
G. (*L.*) *manca* (p. 421)
3. Basal deflection of Cu_1 far before the fork of *M*; *Sc* long, ending beyond the origin of the sector; wings spotted
G. (*G.*) *blanda* (p. 421).
Basal deflection of Cu_1 at or beyond the fork of *M*; *Sc* short, ending opposite or before the origin of the sector; wings unmarked, except the stigmal spot 4.
4. Antennae orange at the base, the flagellum dark 5.
Antennae dark throughout
G. (*G.*) *subcinerea* (p. 421).
5. Cell *first* M_2 closed; femora with a dark brown subterminal ring
G. (*G.*) *sulphurella* (p. 421).
Cell *first* M_2 open; femora without a dark ring
G. (*G.*) *cognatella* (p. 421).

The immature stages are spent in damp earth or sand.

*** GONOMYIA BLANDA Osten Sacken.**

Falls Church, Virginia, June 7, 1914, R. C. Shannon.

*** GONOMYIA COGNATELLA Osten Sacken.**

Difficult Run, Virginia, July 25, 1915, Alexander, McAtee; Plummers Island, May 24, 1914, July 15, 1911, McAtee; Cabin John Bridge, Maryland, May 16, 1909, F. Knab.

GONOMYIA MANCA, Osten Sacken.

Glencarlyn, Virginia, May 30, Nathan Banks; Great Falls, Virginia, August 23, F. Knab; Difficult and Scotts Runs, Virginia, July 25, 1915, Alexander and McAtee; Plummers Island, July 15, 24, 1903, W. V. Warner; August 18, 1912, at light, H. L. Viereck; Maywood, Virginia, August 14, 1917, at light, McAtee; New Alexandria, Virginia, July, 1907, W. Palmer; Forest Glen, Maryland, June 1, 1913, F. Knab.

*** GONOMYIA SUBCINEREA Osten Sacken.**

Numerous records, ranging from May 11 to July 24; comes to light. P. I.

*** GONOMYIA SULPHURELLA Osten Sacken.**

Plate 23, fig. 8.

Falls Church, Virginia, May 3, Nathan Banks; Difficult Run, Virginia, July 25, 1915, Alexander, McAtee; Dead Run, Virginia, May 21, 1914; R. C. Shannon; Rosslyn, Virginia, May 11, 1913, F. Knab; Glencarlyn, Virginia, June 28, N. Banks; Four-mile Run, Virginia, May 31, 1914, McAtee; Washington, District of Columbia, May 31, 1914, Hyattsville, Maryland, August 2, 1908, F. Knab.

Genus GNOPHOMYIA Osten Sacken.

KEY TO SPECIES.

Wings pubescent apically; halteres entirely black_____*G. luctuosa* (p. 422).
Wings without an apical pubescence; knobs of the halteres yellow_____
G. tristissima (p. 422).

The immature stages of the known species are spent beneath the bark of decaying trees.

GNOPHOMYIA LUCTUOSA Osten Sacken.

Dead Run, Virginia, R. C. Shannon; Falls Church, Virginia, August 16, 1916, Tom Ketcher.

* GNOPHOMYIA TRISTISSIMA Osten Sacken.

Abundant; extreme dates of capture, May 5 and October 28; in copula, June 18; bred from tulip tree bark, May 5, 1913, R. C. Shannon. P. I.

Genus TRIMICRA Osten Sacken.

* TRIMICRA ANOMALA Osten Sacken.

Maywood, Virginia, October 16, 1915, at light, McAtee. The immature stages are spent in moist earth.

Genus ORMOSIA Rondani.

KEY TO SPECIES.

1. Wings spotted or clouded with darker_____2.
   Wings unicolorous or nearly so, the stigma only being darker_____3.
2. Anal veins convergent; wings with numerous dark brown dots_____
   O. innocens (p. 422).
   Anal veins divergent; wings with pale clouds of dark-colored hairs_____
   O. nubila (p. 423).
3. Cell *first* M_2 closed_____*O. nigripila* (p. 423).
   Cell *first* M_2 open_____4.
4. Cell *first* M_2 confluent with cell M_3, the outer deflection of M_3 lacking_____5.
   Cell *first* M_2 confluent with cell M_3, *m* lacking_____*O. holotricha* (p. 422).
5. Thorax reddish, stigma indistinct_____*O. rubella* (p. 423).
   Thorax gray, stigma distinct_____6.
6. Gonapophyses of male hypopygium minutely serrate___*O. scrridens* (p. 423).
   Gonapophyses not serrate_____*O. meigenii* (p. 423).

The immature stages are spent in moist earth.

* ORMOSIA HOLOTRICHA Osten Sacken.

Described from specimens collected at Washington, District of Columbia.

* ORMOSIA INNOCENS Osten Sacken.

Dead Run, Virginia, April 19, 1914, R. C. Shannon.

ORMOSIA MEIGENII Osten Sacken.

Great Falls, Virginia, April 20, 1916, common, McAtee.

* ORMOSIA NIGRIPILA Osten Sacken.

Described from specimens collected at Washington, District of Columbia.

* ORMOSIA NUBILA Osten Sacken.

Common; extreme dates of capture, April 4 and October 18; is attracted to sap and to light. V. P. I.

ORMOSIA RUBELLA Osten Sacken.

Beltsville, Maryland, September 28, 1919, McAtee.

* ORMOSIA SERRIDENS Alexander.

Great Falls, Virginia, April 20, 1916; Cabin John Bridge, Maryland, April 13, 1916, McAtee; April 11, 1915, R. C. Shannon.

Tribe LIMNOPHILINI.

KEY TO GENERA.

1. Sc_2 before the origin of the sector; antennae with 17 segments; wings pubescent ..... *Ula* (p. 423).
   Sc_2 beyond the origin of the sector; antennae with not more than 16 segments; wings rarely pubescent ..... 2.
2. Wings pubescent, at least apically ..... 3.
   Wings with microscopic pubescence only ..... 5.
3. Pubescence including the entire wing; cell M_1 absent ..... *Ulomorpha* (p. 424).
   Pubescence only on the apical cells of the wing; cell M_1 present or lacking ..... 4.
4. Small species, wing less than 5.5 mm.; antennæ of both sexes short ..... *Adelphomyia* (p. 424).
   Larger species, wing over 6 mm.; antennæ of the male elongated ..... *Limnophila* (subgenus *Lasiomastix* Osten Sacken).
5. A supernumerary cross vein in cell *C* ..... *Epiphragma* (p. 424).
   No supernumerary cross vein in cell *C* ..... *Limnophila* (p. 424).

Genus ULA Haliday.

KEY TO SPECIES.

Antennae of the male elongate; wings dusky but without a distinct heavy brown pattern ..... *U. paupera* (p. 423).
Antennae short in both sexes; wings with the cord and outer end of cell *first* M_2 seamed with brown ..... *U. elegans* (p. 423).

The larvae are fungicolous, going into the earth to pupate.

ULA ELEGANS Osten Sacken.

Maywood, Virginia, October 15, 1915, at light, McAtee.

* ULA PAUPERA Osten Sacken.

Rosslyn, Virginia, August 25, 1912, F. Knab and J. R. Malloch.

Genus ULOMORPHA Osten Sacken.

The immature stages are spent in organic earth in cool, shaded woods.

ULOMORPHA PILOSELLA Osten Sacken.

Virginia near Plummers Island, June 2, 1916, McAtee.

Genus ADELPHOMYIA Bergroth.

ADELPHOMYIA AMERICANA Alexander.

Several records in the Piedmont region; July 25 to October 22. V. P. I.

Genus EPIPHRAGMA Osten Sacken.

KEY TO SPECIES.

Wings with pale brown crossbands which are margined with darker; a brown ring at the tip of each femur ..... *E. fascipennis* (p. 424).
Wings with an irregular pattern of brown and tawny; a brown ring before the tip of each femur ..... *E. solatrix* (p. 424).

The immature stages live beneath the damp bark of decaying trees.

EPIPHRAGMA FASCIPENNIS Say.

Frequent; April 20 to June 18. P. I.

* EPIPHRAGMA SOLATRIX Osten Sacken.

Common; season April 25 to September 5; comes to light; has been bred from rotten logs. P. I.

Genus LIMNOPHILA Macquart.

KEY TO SPECIES.

1. Cell M_1 of the wings present ..... 2.
   Cell M_1 of the wings lacking ..... 26.
2. A supernumerary cross vein in cell R_2 or in cell M ..... 3.
   No supernumerary cross vein in cell R_2 or in M ..... 4.
3. A supernumerary cross vein in cell R_2; wings broad, with numerous small dots and spots ..... *L. fuscovaria* (p. 426).
   A supernumerary cross vein in cell M; wings with about seven larger brown blotches along the costal margin ..... *L. aprilina* (p. 426).
4. Apical cells of the wings with a slight pubescence; antennæ of male elongated ..... 5.
   Apical cells of the wings not pubescent ..... 6.
5. Coloration shiny black; wings banded with brown ..... *L. macrocera* (p. 427).
   Coloration gray; wings not banded or marked with darker ..... *L. tenuicornis* (p. 428).
6. Thorax shiny black; male hypopygium enlarged and complicated in structure ..... *L. mundoides* (p. 427).
   Thorax not shiny black; male hypopygium simple in structure ..... 7.
7. Posterior tarsi white ..... *L. nivcitarsis* (p. 427).
   Tarsi not white ..... 8.

8. Cross vein *r* removed from the tip of R_1, so that the distance beyond it is from one to one and one-half times the length of *r;* tuberculate pits present----9.
   Cross vein *r* at the tip of R_1; tuberculate pits lacking----18.
9. Cell *first* M_2 very much elongated, the inner end lying far inside the level of the cord----*L. arcolata* (p. 426).
   Cell *first* M_2 not greatly elongated, the inner end at the level of the cord----10.
10. R_{2+3} longer than cell R_2 alone; cross vein *r* on R_{2+3}----*L. ultima* (p. 428).
    R_{2+3} not longer than R_2 alone; cross vein *r* on R_2----11.
11. Cell M_1 very short, not longer than the basal deflection of Cu_1----*L. brevifurca* (p. 426).
    Cell M_1 long, more than half again as long as the basal deflection of Cu_1----12.
12. Head narrow, prolonged behind; cells R_3 and *first* M_2 longer than cell R_5, so that the cord is not in a straight line; radial and medial veins long, slender, arcuated; second anal vein incurved at the tip (*luteipennis* group)----13.
    Head broad, not narrowed behind; cells R_3, R_5, and *first* M_2, with their inner ends about on a level; radial and medial veins stout and straight; second anal vein not incurved at the tip (*tenuipes* group)----16.
13. Wings with small dots on the cross veins and at the forks----Body shiny reddish yellow; front yellowish red----*L. recondita* (p. 427).
    Wings clear, unspotted----14.
14. Thorax clear blue-gray----*L. inornata* (p. 427).
    Thorax brownish without gray----15.
15. Pleura of thorax grayish, unmarked; size small. (Regional)----*L. contempta* Osten Sacken.
    Pleura of thorax dull yellowish with a conspicuous dark-brown stripe extending from the cervical sclerites to the postnotum; size larger----*L. nigripleura* (p. 427).
16. Wings narrow, grayish; stigma distinct, hairy; antennae of the male elongated----*L. tenuipes* (p. 428).
    Wings broader, more yellowish brown; stigma indistinct; antennae short in both sexes----17.
17. Body opaque; front gray. (Regional)----*L. imbecilla* Osten Sacken.
    Body shiny reddish yellow; front yellowish red----*L. recondita* (p. 427).
18. Very large species; wings about 20 mm. long----*L. alleni* (p. 426).
    Smaller species; wings under 15 mm----19.
19. R_{2+3} very long, nearly twice the length of R_2 alone; cross vein *r* on R_{2+3}----*L. ultima* (p. 428).
    R_{2+3} shorter, not longer than R_2 alone; cross vein in *r* on R_2----20.
20. Basal deflection of Cu_1 at the inner end of cell *first* M_2; wings spotted with brown----*L. montana* (p. 427).
    Basal deflection of Cu_1 near the middle of cell *first* M_2----21.
21. Wings spotted with brown or distinctly seamed along the cross veins and deflections of veins----22.
    Wings clear or with only the stigmal spot; *Rs* and R_{2+3} strongly arcuated; cell *first* M_2 broad----*L. toxoneura* (p. 428).
22. Wings heavily irrorate with brown over the entire surface----*L. irrorata* (p. 427).
    Wings not as above----23.
23. *Rs* short, arcuated to almost square at its origin; *r* at about midlength of vein R_2 which is oblique; outer end of cell R_2 very broad, due to the oblique course of vein R_2; body yellow or reddish, the tips of the wings darkened----*L. adusta* (p. 426).

Rs longer; vein R_2 not oblique and cell R_2 not conspicuously widened at its outer end; veins seamed with brown ..... 24.

24. Larger species, wing of the male over 9 mm.; male with the pleural appendage of the hypopygium pectinate ..... 25.

Smaller species, wing of the male under 8.5 mm.; male with the pleural appendage of the hypopygium not pectinate, rather sharply pointed ..... *L. terebrans* (p. 428).

25. Larger species, wing of the male about 13 mm.; costal and subcostal cells of the wings rich yellow; stigma dark brown; bases of femora bright yellow; anterior apical appendage of male hypopygium bifurcate ..... *L. rufibasis* (p. 427).

Smaller, wing of the male about 11.5 mm.; wings uniform light yellowish gray; stigma rather indistinct, grayish; bases of femora brownish yellow; anterior apical appendage of male hypopygium simple. (Regional) ..... *L. simplex* Alexander.

26. Cell R_2 of the winds broadly sessile ..... *L. emmelina* (p. 426).

Cell R_2 of the wings petiolate ..... 27.

27. *Rs* short, about equal to vein R_2 ..... *L. lenta* (p. 427).

Rs long, equal to about twice the length of vein R_2 ..... *L. quadrata* (p. 427).

The immature stages of most of the local species are spent in moist earth. A very few species live beneath the bark of trees.

LIMNOPHILA ADUSTA Osten Sacken.

Dead Run, Virginia, June 29, 1915, R. C. Shannon; October 28, 1919, McAtee; Veitch, Virginia, June 9, 1912, F. Knab.

LIMNOPHILA ALLENI Johnson.

Great Falls, Virginia, May 23, 1918; Mount Vernon, Virginia, July 13, 1917, McAtee.

* LIMNOPHILA APRILINA Osten Sacken.

Great Falls, Virginia, August 11, 1915; Virginia near Plummers Island, September 5, 1915, Dead Run, Virginia, May 10, 1916, McAtee; Glencarlyn, Virginia, June 4, 11, 1911, F. Knab.

* LIMNOPHILA AREOLATA Osten Sacken.

Several records from May 2 to 24. V. P. I.

* LIMNOPHILA BREVIFURCA Osten Sacken.

Great Falls, Virginia, April 20, 1913; C. P. Heinrich, April 20, 1916, McAtee.

* LIMNOPHILA EMMELINA Alexander.

Great Falls, Virginia, April 20, 1913, F. Knab; Maryland near Plummers Island, May 2, 1915, R. C. Shannon; May 10, 1916, McAtee.

* LIMNOPHILA FUSCOVARIA Osten Sacken.

Frequent along streams; extreme dates of collection, May 16 to September 2; comes to light. V. P. I.

LIMNOPHILA INORNATA Osten Sacken.

Hyattsville, Maryland, May 21, 31, August 2, 1909, F. Knab; Dyke, Virginia, May 28, 1915, McAtee.

LIMNOPHILA IRRORATA Johnson.

Mount Vernon, Virginia, July 13, 1917, McAtee.

* LIMNOPHILA LENTA Osten Sacken.

Dead Run, Virginia, R. C. Shannon; Forest Glen, Maryland, May 30, 1914, McAtee.

* LIMNOPHILA LUTEIPENNIS Osten Sacken.

Common; season April 23 to October 10; frequently comes to light. P. I.

LIMNOPHILA MACROCERA Say.

Common; has been collected from May 4 to September 26; in copula, August 29. V. P. I.

* LIMNOPHILA MONTANA Osten Sacken.

Common; extreme dates of collection April 11 and May 11; all records are from Piedmont area. P. I.

* LIMNOPHILA MUNDOIDES Alexander.

Plummers Island, Maryland, June 3, 1914, R. C. Shannon; Beltsville, Maryland, June 9, 1915, McAtee.

LIMNOPHILA NIGRIPLEURA Alexander and Leonard.

Frequent; records date from May 28 to September 29; comes to light. V. P. I.

LIMNOPHILA NIVEITARSIS Osten Sacken.

Bladensburg, Maryland, May 10, 1917, McAtee.

LIMNOPHILA QUADRATA Osten Sacken.

Great Falls, Virginia, May 2, 1916, May 2, 1917; Virginia near Plummers Island, May 8, 1915, McAtee; Falls Church, Virginia, May 13, 17, 1914, A. Wetmore.

LIMNOPHILA RECONDITA Osten Sacken.

Frequent; season, May 20 to September 26; in copula, July 13. V. P. I.

* LIMNOPHILA RUFIBASIS Osten Sacken.

Common; extreme dates of collection April 18 to May 10; in copula, April 20, 27, May 2; comes to light. P. I.

LIMNOPHILA TENUICORNIS Osten Sacken.

Great Falls, Virginia, May 2, 1917, McAtee.

LIMNOPHILA TENUIPES Say.

Common; has been collected from May 20 to October 6; comes to light. P. I.

* LIMNOPHILA TEREBRANS Alexander.

Cabin John, Maryland, May 5, 1899.

LIMNOPHILA TOXONEURA Osten Sacken.

Plummers Island, June 8, 1913, June 2, 1916, McAtee.

* LIMNOPHILA ULTIMA Osten Sacken.

Frequent in fall, September 23 to October 23; comes to light. V. P. I.

Tribe HEXATOMINI.

KEY TO GENERA.

1. Cell *first* M_2 open; only one free branch of the media reaching the wing margin ..... *Hexatoma* (p. 428).
   Cell *first* M_2 closed; two or three free branches of the media reaching the wing margin ..... 2.
2. Tarsi (in the local species) pure white; stigma small; cell M_1 present ..... *Penthoptera* (p. 428).
   Tarsi not white, concolorous or darker than the rest of the legs; cell M_1 lacking in the local species ..... *Eriocera* (p. 429).

Genus HEXATOMA Latreille.

* HEXATOMA MEGACERA Osten Sacken.

Glencarlyn, Virginia, May 1, 1910, F. Knab; Cabin John Bridge, Maryland, April 28, 1912, J. R. Malloch. There is but a single described American species. The larvae are aquatic, but before pupation they come to earth for a short period.

Genus PENTHOPTERA Schiner.

PENTHOPTERA ALBITARSIS Osten Sacken.

Pimmit Run, Virginia, September 6, 1908, F. Knab; Difficult Run, Virginia, July 25, 1915, Alexander and McAtee; Dyke, Virginia, July 16, 1915, Mount Vernon, Virginia, June 19, 1918, Beltsville, Maryland, July 30, 1916, McAtee. *P. albitarsis* is the only known Nearctic species. The immature stages are spent in organic earth in woods, usually underneath a layer of leaf mold.

Genus ERIOCERA Macquart.

KEY TO SPECIES.

1. Coloration of the body yellow or yellowish red; antennae of the male elongated, the basal flagellar segments not armed with spines_____ *E. wilsonii* (p. 429).
   Coloration of the body brown, gray or almost black; antennae of the male short, if elongated, the segments at the base of the flagellum armed with small spines_____ 2.
2. Thoracic dorsum gray; male antennae elongated_____ 3.
   Thoracic dorsum brown or black; antennae short in both sexes_____ 4.
3. Cell *first* M_2 short, pentagonal, usually with a small spur into cell R; valves of the ovipositor short, blunt, subfleshy_____ *E. longicornis* (p. 429).
   Cell *first* M_2 long, hexagonal; valves of the ovipositor elongated, pointed, chitinized_____ *E. cinerea* (p. 429).
4. Wings brown, the stigma small, rounded, brown; abdominal tergites brown__ *E. fuliginosa* (p. 429).
   Wings blackish brown, the stigma oval, dark brown; abdominal tergites black_____ *E. tristis* (p. 429).

The early larval stages of the more common species of *Eriocera* are aquatic. When nearly full grown they are to be found in the sandy soil along the margins of rather large streams.

ERIOCERA CINEREA Alexander.

Pimmit Run, Virginia, September 6, 1908; Forest Glen, Maryland, June 1, 1913; Hyattsville, Maryland, August 2, 1913, F. Knab.

* ERIOCERA FULIGINOSA Osten Sacken.

Plummers Island, June 23, 1907, McAtee; Washington, District of Columbia, July 20, E. A. Schwarz.

ERIOCERA LONGICORNIS Walker.

Common; records all from Piedmont region, date from April 4 to July 30; this species is attracted to light. P. I.

ERIOCERA TRISTIS Alexander.

Frequent; has been collected in Piedmont localities from July 7 to September 1. P. I.

ERIOCERA WILSONII Osten Sacken.

Mount Vernon, Virginia, April 19, 1903.

Tribe PEDICIINI.

KEY TO GENERA.

1. Antennae with 16 segments_____ 2.
   Antennae with 13 or 15 segments_____ 3.
2. Cord oblique; cell *first* M_2 very short, pentagonal; size large, wing over 20 mm.; palpi elongated_____ *Pedicia* (p. 430).
   Cord transverse; cell *first* M_2 elongate; size smaller, wing under 18 mm.; palpi short_____ *Tricyphona* (p. 430).
3. Cross vein r present so three R_1 cells are present_____ *Dicranota* (p. 431).
   Cross vein r lacking, two R_1 cells being present_____ *Rhaphidolabis* (p. 431).

Genus PEDICIA Latreille.

PEDICIA ALBIVITTA Walker.

Spring Hill, Virginia, September 21, 1911; Rosslyn, Virginia, October 6, 1912, F. Knab; Falls Church, Virginia, September 17, 1919, at light, L. O. Jackson; Thrifton, Va., October 15, 1919, in spider web, McAtee; Cleveland Park, District of Columbia, September 17, 1906, E. A. Preble. The immature stages are semiaquatic, living in cold springs, in saturated moss, and in similar situations. Practically all of the adults taken here have come to light or have been found in spider webs. Alexander has caught two species at light, and has found them sitting on tree trunks by day; the indications are therefore that *Pedicia* is crepuscular or nocturnal in its activities.

Genus TRICYPHONA Zetterstedt.

KEY TO SPECIES.

1. Cell R_3 of the wings short petiolate; *m–cu* obliterated by the fusion of Cu_1 with M_3; general coloration yellowish; wings with the costal region darkened ..... *T. inconstans* (p. 430).
   Cell R_3 of the wings broadly sessile; *m–cu* present or barely obliterated by the fusion of Cu_1 with M_3; general coloration gray; wings with brown or gray spots and clouds ..... 2.
2. Antennae with the basal segments dull yellowish, notably brighter than the black flagellum; wings with a brownish tinge, marked with pale brown spots along the costal margin and pale gray clouds at the ends of the longitudinal veins; the mark at the origin of the sector does not pass into the costal cell; cell M_1 sessile or very short petiolate ..... *T. vernalis* (p. 430).
   Antennae black throughout; wings nearly hyaline, with large brown spots along the costal margin, the mark at the origin of the sector passing into the costal cell; cell M_1 long petiolate ..... *T. macateei* (p. 430).

The immature stages are spent in moist earth.

* TRICYPONA INCONSTANS Osten Sacken.

Common and widespread; has been collected from April 20 to October 6. V. P. I.

* TRICYPONA MACATEEI Alexander.

Beltsville, Maryland, October 7, 1917; Bear Branch, Maryland, September 28, 1919, McAtee.

* TRICYPONA VERNALIS Osten Sacken.

Plate 23, fig. 10.

This species was described from specimens collected at Washington, District of Columbia, in April.

Genus DICRANOTA Zetterstedt.

KEY TO SPECIES.

1. Cell M_1 lacking ..... 2.
   Cell M_1 present ..... *D. noveboracensis* (p. 431).
2. Halteres with the knobs darkened; antennae of male elongated, longer than the thorax ..... *D. eucera* (p. 431).
   Halteres pale; antennae short in both sexes ..... *D. rivularis* (p. 431).

The immature stages of the known species are spent in saturated earth.

* DICRANOTA EUCERA Osten Sacken.

Dead Run, Virginia, April 13, 1916, McAtee; Rosslyn, Virginia, March 24, F. Knab.

* DICRANOTA NOVEBORACENSIS Alexander.

Great Falls, Virginia, April 20, 1916; Dead Run, Virginia, April 23, 1914, April 16, 1915, R. C. Shannon.

* DICRANOTA RIVULARIS Osten Sacken.

Dead Run, Virginia, April 13, 1916, McAtee; Falls Church, Virginia, April 14, 1914, C. P. Heinrich.

Genus RHAPHIDOLABIS Osten Sacken.

KEY TO SPECIES.

Inner pleural appendage of the hypopygium a long, slender, chitinized blade which tapers gradually to the acute tip; ninth pleurite without a fingerlike lobe on the proximal face; gonapophyses shaped like the head and beak of a bird, the beak inserted just before the apex ..... *R. tenuipes* (p. 431).
Inner pleural appendage of the small hypopygium scarcely longer than the small outer appendage, the apex obtusely rounded; ninth pleurite with a slender, fingerlike lobe on the proximal face; gonapophyses slender, the apex dilated and deeply bifid; the two lobes thus formed directed toward one another, pincerlike ..... *R. persimilis* (p. 431).

The immature stages are semiaquatic.

* RHAPHIDOLABIS PERSIMILIS Alexander.

Difficult Run, Virginia, October 28, 1917, McAtee; April 20, 1913, C. P. Heinrich; Dead Run, Virginia, May 10, 1916, Virginia near Plummers Island, September 5, 1915, McAtee.

RHAPHIDOLABIS TENUIPES Osten Sacken.

Dead Run, Virginia, September 27, 1914, R. C. Shannon.

Subfamily CYLINDROTOMINAE.

Genus LIOGMA Osten Sacken.

*LIOGMA NODICORNIS Osten Sacken, var. FLAVEOLA Alexander.

Great Falls, Virginia, May 22, Nathan Banks; May 23, 1918, in copula, McAtee; Falls Church, Virginia, June 7, Nathan Banks; Glencarlyn, Virginia, June 11, 1911, F. Knab; June 1, 1919, Maryland; near Plummers Island, June 2, 1916; Beltsville, Maryland, June 18, 1916, McAtee. The present species is the only member of the interesting group Cylindrotominae as yet found in the region under consideration. The local specimens represent a variety which is much more yellow than the typical northern *L. nodicornis*. The immature stages of species of this genus are terrestrial, living in cushions of mosses of the genus *Hypnum* and related forms.

RECENT SYNONYMY.

Certain names applied to species of crane-flies that have been recorded from the District of Columbia region are omitted from this paper. In each case, however, these names are synonyms of others which are here recorded. Synonyms that have been known for many years may be consulted in Aldrich's Catalogue.[1] The more recent synonymy is herewith listed:

**Dicranomyia curvivena* Coquillett	=*Gonomyia manca* Osten Sacken.
Erioptera dulcis Osten Sacken (eastern records only)	=*E. needhami* Alexander.
Erioptera chlorophylla Osten Sacken (in part)	=*E. furcifer* Alexander.
Cladura indivisa Osten Sacken	=*C. flavogerruginea* Osten Sacken.
Eriocera antennaria Doane	=*E. wilsonii* Osten Sacken.
Tipula calva Doane	=*T. valida* Loew.
T. cincta Loew	=*T. iroquois* Alexander.
T. costalis Say	=*T. sayi* Alexander.
T. cuspidata Doane	=*T. submaculata* Loew.
T. devia Dietz	=*T. translucida* Doane (?).
T. fasciata Loew	=*T. hermannia* Alexander.
T. filipes Walker	=*T. perlongipes* Johnson.
T. flavicans Fabricius	=*T. ultima* Alexander.
T. inermis Doane	=*T. umbrosa* Loew.
T. infuscata Loew	=*T. cunctans* Say.
T. speciosa Loew	=*T. fuliginosa* (Say).
T. suspecta Loew	=*T. fragilis* Loew.
**T. winnemana* Alexander	=*T. johnsoniana* Alexander.

[1] J. M. Aldrich, A catalogue of the North American Diptera, 1905.

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New or little-known crane-flies from the United States and Canada. Tipulidae, Diptera. Proc. Acad. Nat. Sci. Philadelphia, vol. 66, pt. 3, 1914 (Feb. 16, 1915), pp. 579–606, pls. 25–27.

Describes a new species of *Rhipidia*, records another, and describes a new *Limnophila* from our region.

The biology of the North American crane-flies (Tipulidae, Diptera). IV. The tribe Hexatomini. Journ. Ent. Zool., vol. 7, No. 3, Sept. 1915, pp. 141–158, pls. 1–2.

Records 3 species.

New nearctic crane-flies in the United States National Museum. Insecutor Inscitiae Menstruus, vol. 3, Nos. 11–12, Nov.–Dec. 1915, pp. 127–142.

Contains the original description of *Tipula winnemana*, p. 137, now considered a synonym of *T. johnsoniana* Alexander.

New or little-known crane-flies from the United States and Canada; Tipulidae, Diptera, part 2. Proc. Acad. Nat. Sci. Philadelphia, vol. 67, pt. 3, Sept. 1915, Jan. 1916, pp. 458–514, pls. 16–21.

Discusses 8 of Loew's species of *Tipula* described from District of Columbia material, and records the selection in 3 cases as lectotypes of specimens collected here. Contains mention of 7 other species of *Tipula*, the original descriptions of 6 of them based wholly or in part on local material.

New nearctic crane-flies (Tipulidae, Diptera). Can. Ent., vol. 48, No. 2, Feb. 1916, pp. 42–53.

Describes from the region one new species of *Dicranomyia* and one of *Tcucholabis*.

New Limnophiline crane-flies from the United States and Canada (Tipulidae, Diptera). Journ. N. Y. Ent. Soc., vol. 24, No. 2, June, 1916, pp. 118–125.

Two new species of *Limnophila* of local origin.

New or little-known crane-flies from the United States and Canada; Tipulidae, Ptychopteridae, Diptera, part. 3. Proc. Acad. Nat. Sci. Philadelphia, vol. 68, pt. 3, Oct. 1916, pp. 486–549, pls. 25–31.

Records 12 local species, 2 new.

New nearctic crane-flies (Tipulidae, Diptera), part. 3. Can. Ent., vol. 49, No. 6, June, 1917, pp. 199–211.

One new species of *Erioptera* from our region.

New nearctic crane-flies (Tipulidae, Diptera), part 4. Can. Ent., vol. 50, No. 2, Feb. 1918, pp. 60–71.

Two new species of *Tipula* based, one wholly, one in part, on local material.

Notes on the genus Dicranoptycha Osten Sacken (Tipulidae, Diptera). Ent. News, vol. 30, No. 1, Jan. 1919, pp. 19–22.

Records 2 species from our region.

New nearctic species of the genus Erioptera Meigen (Tipulidae, Diptera). Bull. Brooklyn Ent. Soc., vol. 14, June, 1919, pp. 104–108.

Describes a new species of the *chlorophylla* group.

New nearctic crane flies (Rhyphidae and Tipulidae, Diptera), part 7. Can. Ent., vol. 51, No. 7, July, 1919, pp. 162–172.

Describes a new species of *Tricyphona* from this region.

ALEXANDER, CHARLES P.—Continued.

New nearctic crane flies (Tipulidae, Diptera), part 8. Can. Ent., vol. 51, Nos. 8–9, Aug.-Sept., 1919, p. 195.

Liogma nodicornis flavcola new subspecies described, type locality Great Falls, Virginia.

New species of Eriopterine crane flies from the United States. Insecutor Inscitiae Menstruus., vol. 7, Nos. 7–9, July–Sept., 1919 (Nov. 17), pp. 143–144.

Ormosia serridens, new species based on local collections.

Two undescribed Pedicüne crane-flies from the United States (Tipulidae, Diptera). Can. Ent., vol. 52, No. 4, April, 1920, pp. 78–80.

Describes *Rhaphidolabis persimilis* from this region.

A new species of Tipula. Journ. Ent. and Zool. (Pomona), vol. 12, pp. ——, 1920.

Describes *T. mallochi* in part from local material.

BANKS, NATHAN.

At the Ceanothus in Virginia. Ent. News, vol. 23, No. 3, March, 1912, pp. 102–110.

Geranomyia rostrata on this flower at Falls Church, Virginia.

CAUDELL, A. N.

Notes on the yellow crane fly, *Tipula flavicans* Fab. Proc. Ent. Soc. Wash., vol. 15, No. 1. 1913, pp. 45–46.

Habits of *Tipula ultima*.

COQUILLETT, D. W.

New genera and species of Diptera. Proc. Ent. Soc. Wash., vol. 9, 1907 (1908), pp. 144–148.

Contains the original description of *Dicranomyia curvivena*, now considered a synonym of *Gonomyia manca* Osten Sacken.

DIETZ, WILLIAM G.

A revision of the North American species of the Tipulid genus Pachyrhina Macquart, with descriptions of new species (Diptera). Trans. Amer. Ent. Soc., vol. 44, pp. 105–140, June 10, 1918.

Three news species are based wholly or in part on local material.

The Streptocera group of the Dipterous genus Tipula Linnaeus. Ann. Ent. Soc. Amer., vol. 12, June, 1919, pp. 85–94, pl. 5.

Describes *Tipula devia* from Plummers Island. This is apparently the same as *T. translucida* Doane.

KNAB, F.

The feeding habits of Geranomyia. Proc. Ent. Soc. Wash., vol. 12, No. 2, 1910, pp. 61–65.

Notes on the flower frequenting habits of three species of crane flies. The *Geranomyia diversa* of this paper is in reality *Toxorhina muliebris*.

LOEW, H.

Diptera Americae septentrionalis indigena. Centuria quarta, vol. 1, 1861, pp. 164–181.

Describes 6 species of *Tipula* and 3 of *Pachyrhina* from the District of Columbia; one of the latter, *P. unifasciata*, is now placed in the genus *Tipula*. The *Tipula suspecta* of this paper probably is *T. fragilis*, and the *T. cincta* has been renamed *T. iroquois* Alexander.

Centuria quinta, vol. 1, 1861, pp. 219–225.

Describes *Tipula fraterna* and *Pachyrhina virescens* from local material.

McATEE, W. L.

A sketch of the natural history of the District of Columbia, etc. Bull. 1, Biol. Soc. Wash., May, 1918, 142 pp., 5 maps.

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OSTEN SACKEN, C. R.

New genera and species of North American Tipulidae with short palpi, with an attempt at a new classification of the tribe. Proc. Acad. Nat. Sci. Philadelphia, vol. 11, pp. 197–256, pls. 3–4, August, 1859.

This remarkable pioneer paper, which firmly established the basis of classification of the smaller crane flies, records 46 species from the District of Columbia, 42 of them being described as new. Of these only 2 have since been found to be synonyms—namely, *Geranomyia communis*, which equals *G. canadensis* Westwood, and *Limnobia defuncta*, which equals *Dicranomyia simulans* Walker.

Descriptions of nine new North American Limnobiaceae. Proc. Acad. Nat. Sci. Philadelphia, vol. 13, pp. 287–292, September, 1861.

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Description of some new genera and species of North American Limnobina. Proc. Ent. Soc. Philadelphia, vol. 4, 1865, pp. 224–242.

Describes *Triogma nodicornis* from material in part of local origin.

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Records 64 species from our region, 5 of which are described as new.

Studies on Tipulidae. Part 1. Review of the published genera of the Tipulidae longipalpi. Berlin. Ent. Zeitschr., vol. 30, 1886, pp. 153–188.

Records *Brachypremna dispellens*.

EXPLANATION OF PLATE 23.

VENATION OF LOCAL GENERA OF CRANE-FLIES.

FIG. 1. *Ptychoptera* (*japonica* Alexander).
2. *Geranomyia canadensis* Westwood.
3. *Rhamphidia flavipes* Macquart.
4. *Dicranoptycha winnemana* Alexander.
5. *Toucholabis lucida* Alexander.
6. *Erioptera* (*elegantula* Alexander).
7. *Molophilus ursinus* Osten Sacken.
8. *Gonomyia sulphurella* Osten Sacken.
9. *Limnophila* (*inconcussa* Alexander).
10. *Tricyphona vernalis* Osten Sacken.

Names in parentheses represent exotic species, the others are local forms.

Explanation of symbols: Longitudinal veins: *C*=costa; *Sc*=subcosta; *R*=radius; *M*=media; *Cu*=cubitus; *A*=anal veins; *Rs*=radial sector or praefurca. Cross veins: *r*=radial; *r-m*=radio-medial; *m*=medial; *m-cu*=medio-cubital.